Meridian 1

Option 11C and 11C Mini

Fault Clearing Guide

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About this guide

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

This guide contains fault clearing information for Option 11C and Option 11C Mini.

To use this guide, you should have a basic knowledge of Option 11C operation and maintenance. It contains information required to maintain, clear faults, and replace defective components in the Option 11C system:

- maintenance features for Option 11C
  - — Precautions: guidelines to avoid personal injury and equipment damage
  - — Communicating with the system: methods for exchanging information with the system
  - — Hardware maintenance tools: descriptions of circuit card hardware, CPU controls, system alarms, and system monitor indicators
  - — Software maintenance tools: descriptions of diagnostic programs, the History File, and interactive diagnostics
  - — Customer technical assistance service: Nortel Networks Technical Assistance Centers and services
- locating and clearing faults in the Option 11C based on the assumption that the system is properly installed (for example, all circuit card locations, option switch settings, and cable connections are correct) and was fully operational before the fault.

In this guide, “replacing hardware” means removing a faulty piece of equipment and installing identical operating equipment.

Chapter 1 — Precautions

Content list

The following are the topics in this section:

- General precautions 15
- Fiber cable 16
- Circuit cards 17

General precautions

Option 11C equipment is based on solid state circuitry which is sensitive to static electricity and environmental conditions. Follow the precautions in this chapter to avoid personal injury and equipment damage.

WARNING

To avoid the danger of electric shock, be careful when working with power equipment and connections. Warning notices are displayed and should be heeded.

In the Option 11C power supply, there are no user-serviceable parts other than the batteries. Do not disassemble a power supply under any circumstances, because there is risk of electric shock. If a power supply fails, it must be replaced.

To remove depleted batteries and replace with fully charged ones, use the procedures in this guide.

To avoid damage to circuit cards from static discharge, wear the antistatic wrist strap provided in the bottom of each cabinet when you work on circuit cards.

For Option 11C Mini, the power supply is internal to the chassis, and not field serviceable. In addition, there is no battery backup supported in the Option 11C Mini.

Fiber cable

The following precautions should be observed when handling fiber cables.

- Do not staple
- Avoid sharp bends
- Use the fiber management device supplied to route the cable between cabinets
- Always place protective caps on the fiber optic cable connectors when the fiber cable is removed. The connectors must be kept clean.

WARNING

The fiber optic interface product used in 11C is considered safe. However, as a precaution do not view the optical port or the end of fiber optic cable. Under certain conditions (such as during cable testing or under light magnification) the cable or port may expose the eye beyond the limits of Maximum Permissible Exposure recommended in some jurisdictions. Do not remove protective caps or plugs until ready to connect the cable.

Circuit cards

Handle circuit cards as follows:

- Wear the antistatic wrist strap before handling circuit cards.
- Handle cards by the card stiffeners and edges only. Do not touch the contacts or components.
- Keep cards installed in the system as much as possible to avoid dirty contacts and unnecessary wear.
- Set cards on a protective antistatic bag. If an antistatic bag is not available, hold the card, or set it in a card slot unseated from the connectors.
- Unpack or handle cards away from electric motors, transformers, or similar machinery.
- Store cards in protective packing. Do not stack cards on top of each other unless they are packaged.
- Store cards in a dry dust-free area.

During repair and maintenance procedures:

- Insert cards into compatible slots only.
- Turn off the circuit breaker or switch for a cabinet power supply before the power supply is removed or inserted. For the Option 11C Mini, turn off the power switch located on the inside front panel of the chassis (the power status LED will then turn off).
- Software disable cards, if applicable, before they are removed or inserted.
- Hardware disable cards, whenever there is an enable/disable switch, before they are removed or inserted.
- Return defective or heavily contaminated cards to a repair center; do not try to repair or clean them.

Chapter 2 — Communicating with the system

Content list

The following are the topics in this section:

- Reference list 19
- System terminal 19
- Software format 20
- Local and remote access 20
- Maintenance telephone 23

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- “Accessing the system” on page 71

You can exchange information with the system through *system terminals* and the *maintenance telephone*. This chapter discusses these tools for communicating with the system.

System terminal

You can send maintenance commands and receive system messages by accessing the CPU through an RS-232 device, such as a video display terminal (VDT) or teletypewriter (TTY).

Software format

Through the system terminal, you can enter commands that tell the system to perform specific tasks; the system performs the tasks and sends messages back to the system terminal, indicating status or errors. System messages, along with indicators such as light emitting diode (LED) indicators, identify faults in the system.

System messages are codes with a mnemonic and number. Some messages contain additional information indicating the location of the fault, such as BSD090 MAIN. The mnemonic identifies a software program or a type of message. The number identifies the specific message. Table 1 gives an example of the format for a system message.

See the *X11 System Messages Guide* (553-3001-411) for a description of all maintenance commands and the interpretation of all system messages.

Table 1
System message format

System message: BSD090 MAIN	Interpretation
BSD090	This message concerns power equipment or information generated by the system monitor for Option 11C.
MAIN	Additional information indicating a power fault in the MAIN cabinet.

Local and remote access

Many devices can be installed at local and remote locations.

Option 11C

With the Option 11C, a system terminal can be connected at the main and expansion cabinets.

> ***Note:*** The expansion cabinets must be connected to the main cabinet with fiber optic cable. Upgraded systems that are still interconnected with copper cable do not have a system terminal capability at the expansion cabinet.

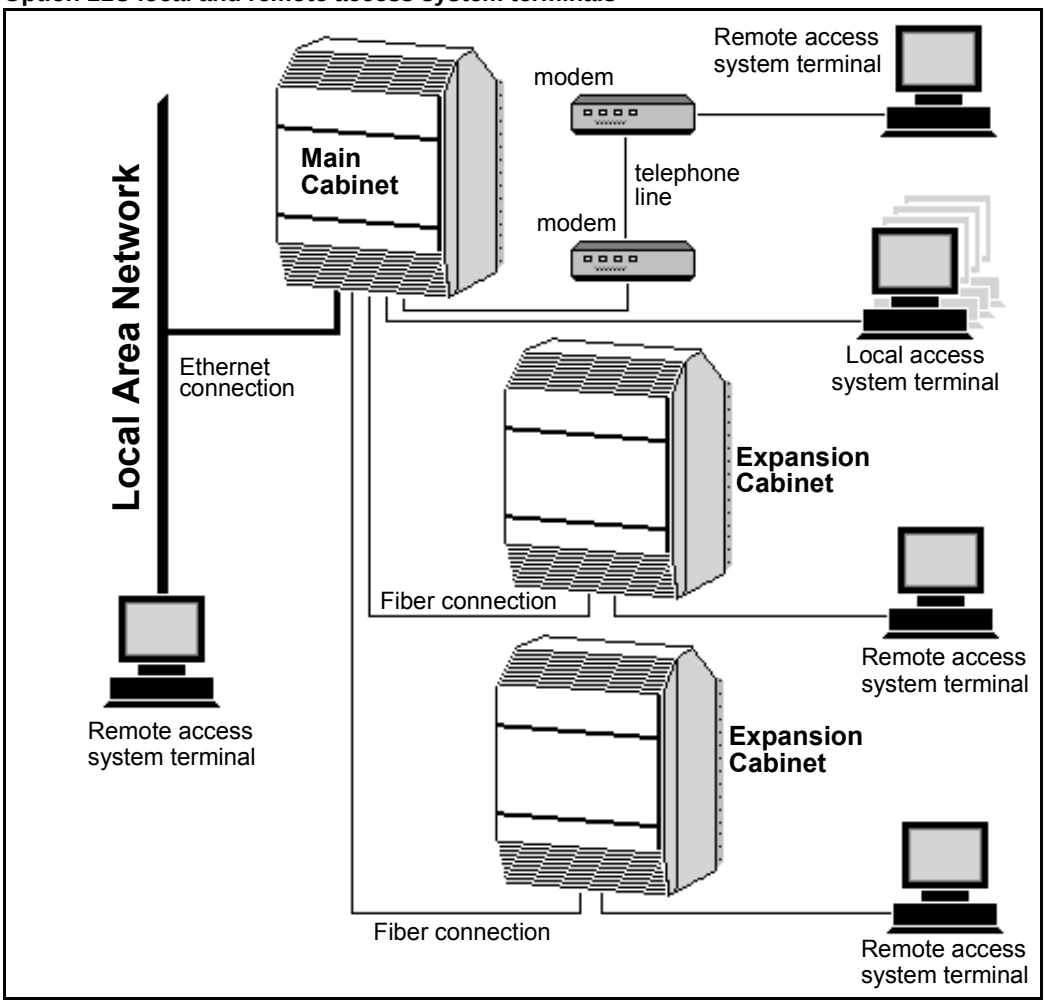
When a system terminal is installed at the main cabinet, it is connected to a Serial Data Interface (SDI) port located within the main cabinet.

When a system terminal is connected to an expansion cabinet, it is connected to a Serial Data Interface (SDI) port which is part of the Fbr Rcvr card in the expansion cabinet.

When a system terminal is installed at a remote location that does not have an expansion cabinet, modems and a telephone line are required between the terminal and the SDI port.

An alternate connection option for either local or remote access is to connect to the system using Ethernet in the main cabinet. Figure 1 shows typical system terminal configurations.

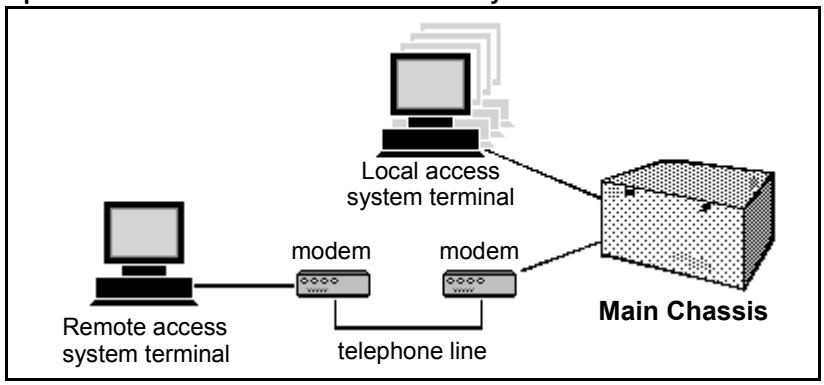
Figure 1
Option 11C local and remote access system terminals



Option 11C Mini

When a terminal is installed locally, it is connected directly to a Serial Data Interface (SDI) port located within the main chassis. When a system terminal is installed at a remote location, modem and a telephone line are required between the terminal and SDI port. Figure 2 shows typical system terminal configurations.

Figure 2
Option 11C Mini local and remote access system terminals



Maintenance telephone

A telephone functions as a maintenance telephone when you define the class-of-service as MTA (maintenance allowed) in LD 11 or the telephone is assigned as a Model 99.

A maintenance telephone allows you to send commands to the system, but you can only use a subset of the commands that can be entered from a system terminal. The maintenance telephone, however, takes priority over a system terminal and will log the terminal out.

You can test tones and outpulsing through the maintenance telephone. Specific commands for tone testing are given in Tone and Digit Switch and Digitone Receiver Diagnostic (LD 34).

To enter commands on a maintenance telephone, you press the keys that correspond to the letters and numbers of the command. Refer to “Accessing the system” on page 71 for information about entering commands from a maintenance telephone.

Chapter 3 — Hardware maintenance tools

Content list

The following are the topics in this section:

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- Faceplate LEDs 27
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- NTDK20 SSC card Faceplate LEDs 35
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- NTDK97 MSC card Faceplate LEDs 38
- NTRB21 Faceplate LEDs 38
- Monitor Jacks 40
- Initialize button 41
- System alarms 41
- Major alarms 41
- Minor alarms 41

- Remote alarms 42
- System monitor 42
- Line transfer 43
- Power loss 44
- Cabinet power supply failure 44
- Temperature alarms 45

Reference list

The following are the references in this section:

- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)
- *X11 Administration* (553-3001-311)

There are fault indicators and hardware features which help perform maintenance tasks (particularly identifying and clearing faults). These maintenance tools include:

- Circuit card features which perform self-tests, indicate status, and minimize adverse affects on call processing.
- CPU controls which allow you to control common equipment functions.
- System monitor indicators which identify power and temperature faults.

Circuit card features

Circuit card features include:

- self-tests
- LED indicators
- enable/disable switches

Self-tests

A self-test checks to see that a card is working correctly. Many cards perform a self-test on powerup. The software commands Disable and Enable forces a card to self-test. The results of a self-test generally show whether or not there is a problem with the card.

Self test information for ISDN BRI cards are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

Self test information for ISDN 1.5 Mb DTI/PRI cards are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

Self test information for ISDN 2 Mb DTI/PRI cards are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Enable and disable switches.

Some cards have a switch on the faceplate to disable the card.

When you remove a card, whenever possible disable it in software, then set the switch on the card to DIS. When you install a card, set the switch to DIS before you insert it. After the card is positioned, set the switch to ENB, then enable it in software. Software disabling and enabling of cards is described in the *X11 Administration* (553-3001-311).

Faceplate LEDs

NTAK09 Faceplate LEDs

The NTAK09 1.5 Mb DTI/PRI circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the NTAK09 circuit card. The remaining two LEDs are associated with the optional daughter boards. The first of these LEDs is used to indicate the status of the NTAK20 Clock Controller daughter board, the second LED indicates the status of the NTAK93 D-channel interface daughter board.

The LEDs found on the NTAK09 DTI/PRI circuit card are described in the following table.

Table 2
NTAK09 LEDs

Affected circuit card	LED	State	Definition
NTAK09	DIS	On (Red)	NTAK09 circuit card is disabled.
		Off	NTAK09 is not in a disabled state.
	ACT	On (Green)	NTAK09 circuit card is in an active state. No alarm states exist, the card is not disabled, nor is it in a loopback state.
NTAK09	ACT	Off	An alarm state or loopback state exists, or the card has been disabled. See other faceplate LEDs for more information.
	RED	On (Red)	A red-alarm state is detected.
		Off	No red alarm.
	YEL	On (Yellow)	A yellow alarm state is detected.
		Off	No yellow alarm.
	LBK	On (Green)	NTAK09 is in loopback mode.
		Off	NTAK09 is not in loopback mode.
NTAK20	CC	On (Red)	NTAK20 is equipped and disabled.
		On (Green)	NTAK20 is equipped and is either locked to a reference or is in free run mode.

Table 2
NTAK09 LEDs (Continued)

Affected circuit card	LED	State	Definition
		Flashing (Green)	NTAK20 is equipped and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking this may be an acceptable state. Check for slips and related clock controller error conditions. If none exist, then this state is acceptable, and the flashing is identifying jitter on the reference.
		Off	NTAK20 is not equipped.
NTAK93/ NTBK51	DCH	On (Red)	D-channel daughter board is equipped and disabled.
		On (Green)	D-channel daughter board is equipped and enabled.
		Off	D-channel daughter board is not equipped.

Note: Only one of the five NTAK09 related LEDs should be on at any one time.

NTAK10 Faceplate LEDs

The NTAK10 2 Mb DTI circuit card has a total of six faceplate LEDs. Five of the LEDs are directly associated with the operation of the NTAK10 2 Mb DTI circuit card. The remaining LED is associated with the on-board clock controller.

The LEDs on the NTAK10 are described in the table below:

Table 3
NTAK10 LEDs

LED	State	Definition
DIS	On (Red)	The NTAK10 2 Mb DTI circuit card is disabled.
	Off	The NTAK10 2 Mb DTI is not in a disabled state.
OOS	On (Yellow)	The NTAK10 2 Mb DTI circuit card is in an out of service state. No alarm states exist, the card is not disabled, nor is it in a loopback state.
	Off	The NTAK10 is not in an out of service state.
NEA	On (Yellow)	A near end alarm state has been detected.
	Off	No near end alarm.
FEA	On (Yellow)	A far end alarm state has been detected.
	Off	No far end alarm
LBK	On (Yellow)	NTAK10 2 Mb DTI is in loopback mode.
	Off	NTAK10 2 Mb DTI is not in loopback mode.
CC	On (Red)	The clock controller is switched on and disabled.
	On (Green)	The clock controller is switched on and is either locked to a reference or is in free run mode.

Table 3
NTAK10 LEDs (Continued)

LED	State	Definition
	Flashing (Green)	The clock controller is switched on and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD 60. If the CC is tracking this may be an acceptable state. Check for slips and related clock controller error conditions. If none exist, then this state is acceptable, and the flashing is identifying jitter on the reference.
	Off	The clock controller is switched off.

NTAK79 Faceplate LEDs

The NTAK79 2 Mb PRI circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the Primary Rate interface (PRI). The remaining two LEDs are associated with the on-board Clock Controller and the on-board D-channel interface (DCHI).

The NTAK79 faceplate LEDs are described in the following table:

Table 4
NTAK79 LEDs

LED	State	Definition
OOS	On (Red)	NTAK79 2 Mb PRI circuit card is either disabled or out-of-service.
	Off	NTAK79 2 Mb PRI is not in a disabled state.
ACT	On (Green)	NTAK79 2 Mb PRI circuit card is in an active state.
	Off	NTAK79 2 Mb PRI is not in a disabled state. The OOS LED will be red.
RED	On (Red)	A red alarm state has been detected. This represents a local alarm state of: Loss of Carrier (LOS) Loss of Frame (LFAS), or Loss of CRC Multi-frame (LMAS).
	Off	No red (local) alarm.
YEL	On (Yellow)	A yellow alarm state has been detected. This represents a remote alarm indication from the far end. The alarm may be either Alarm Indication (AIS) or Remote Alarm (RAI).
	Off	No yellow (remote) alarm.

Table 4
NTAK79 LEDs (Continued)

LED	State	Definition
LBK	On (Green)	NTAK79 2 Mb PRI is in loopback mode.
	Off	NTAK79 2 Mb PRI is not in loopback mode.
CC	On (Red)	The clock controller is switched on and disabled.
	On (Green)	The clock controller is switched on and is either locked to a reference or is in free run mode.
	Flashing (Green)	The clock controller is switched on and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD60. If the CC is tracking this may be an acceptable state. Check for slips and related clock controller error conditions. If none exist, then this state is acceptable, and the flashing is identifying jitter on the reference.
	Off	The clock controller is switched off.
DCH	On (Red)	DCHI is equipped and disabled.
	On (Green)	DCHI is equipped and enabled, but not necessarily established.
	Off	DCHI is switched off.

NTBK50 Faceplate LEDs

The NTBK50 circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the PRI. The remaining two LEDs are associated with the Clock Controller and DCHI/DDCH daughter board.

The NTBK50 2 Mb PRI circuit card LEDs are described in the following table:

Table 5
NTBK50 faceplate LEDs

LED	State	Definition
OOS	On (Red)	The NTBK50 2 Mb PRI circuit card is either disabled or out-of-service. Also, the state of the card after power-up, completion of self test, and exiting remote loopback.
	Off	The NTBK50 2 Mb PRI is not in a disabled state.
ACT	On (Green)	The NTBK50 2 Mb PRI circuit card is in an active state.
	Off	The NTBK50 2 Mb PRI is in a disabled state. The OOS LED is red.
RED	On (Red)	A red alarm state has been detected. This represents a local alarm state of Loss of Carrier (LOS), Loss of Frame (LFAS) or Loss of CRC Multi-frame (LMAS).
	Off	No red (local) alarm.
YEL	On (Yellow)	A yellow alarm state has been detected. This represents a remote alarm indication from the far end. The alarm may be either Alarm Indication (AIS) or Remote Alarm (RAI).
	Off	No yellow (remote) alarm.
LBK	On (Green)	NTBK50 2 Mb PRI is in loopback mode.
	Off	NTBK50 2 Mb PRI is not in loopback mode
CC	On (Red)	The clock controller is software disabled

Table 5
NTBK50 faceplate LEDs (Continued)

LED	State	Definition
CC	On (Green)	The clock controller is enabled and is either locked to a reference or is in free run mode
	Flashing (Green)	NTAK20 is equipped and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD60. If the CC is tracking this may be an acceptable state. Check for slips and related clock controller error conditions. If none exist, then this state is acceptable, and the flashing is identifying jitter on the reference.
	Off	The clock controller is not equipped.
DCH	On (Red)	DCH is disabled.
	On (Green)	DCH is enabled, but not necessarily established.
	Off	DCH is not equipped.

NTDK20 SSC card Faceplate LEDs

The NTDK20 SSC (Small System Controller) card has three or five faceplate LEDs, depending on the version of the card. The top LED indicates the status of the NTDK20 SSC circuit card and the PCMCIA device. The remaining LEDs indicate the status of the Fiber Expansion Daughter Boards. Fbr 1, Fbr 2, Fbr 3 and Fbr 4 indicate the status of fiber link 1, 2, 3 and 4 respectively.

Note: Depending on the version of NTDK20 SSC card, it may be equipped with two or four Fiber Expansion Daughterboard status LEDs.

Table 6
NTDK20 LEDs

LED	State	Definition
Top	Yellow	SSC is in disabled state.
	Red (steady) Red (flashing three times)	SSC self-test being performed Self-test passed
	Off	SSC is in normal operating mode.
	Green (steady or flashing)	PCMCIA device is being accessed.
Fbr 1 Fbr 2 Fbr 3 Fbr 4	Red (steady) Red (flashing three times)	Fiber Daughter Board is in disabled state. Self-test passed
	Yellow	Fiber Daughter Board is enabled, link is not established.
	Green	Fiber Daughter Board is enabled, link is established.
	Off	Invalid state, hardware malfunction

NTDK23, NTDK25, and NTDK80 Fbr Rcvr card Faceplate LEDs

The NTDK23 Fbr Rcvr (10 m Fiber Receiver), NTDK25, and NTDK80 Fbr Rcvr (3 km Fiber Receiver) card have three faceplate LEDs. The top LED indicates the status of the card. The middle LED indicates the status of the Serial Data Interface (SDI) port. The bottom LED indicates the status of the fiber link.

Table 7
NTDK23, NTDK25, and NTDK80 LEDs

LED	State	Definition
Top	On	Card is in disabled state.
	Off	Card is in normal operating mode.
SDI	On	SDI port is in disabled state.
	Off	SDI port is in normal operating mode.
Fbr	Red (steady)	Self-test in progress.
	Red (flashing three times)	Self-test passed.
	Yellow	Fiber link is not established.
	Green	Fiber link is established.
	Off	Invalid state, hardware malfunction

NTDK97 MSC card Faceplate LEDs

The NTDK97 MSC card has three faceplate LEDs. The top LED indicates the status of the NTDK97 MSC circuit card and the PCMCIA device. The remaining LEDs indicate the status of the Ethernet Link and Collision.

Table 8
NTDK97 LEDs

LED	State	Definition
Top	Yellow	MSC is in disabled state.
	Red (steady) Red (flashing three times)	MSC self-test being performed Self-test passed
	Off	MSC is in normal operating mode.
	Green (steady or flashing)	PCMCIA device is being accessed.
Link	On	Sysload in progress
	Off	Ethernet interface is enabled (whether Ethernet is configured or not). This LED remains off during normal use.
Collision	On	Collision occurred on Ethernet connection
	Off	No collision

NTRB21 Faceplate LEDs

The NTRB21 1.5 Mb DTI/PRI/DCH circuit card has a total of seven faceplate LEDs. Five of the LEDs are directly associated with the operation of the NTRB21 circuit card. The remaining two LEDs are associated with the optional daughter boards. The first of these LEDs is used to indicate the status of the NTAK20 Clock Controller daughter board, the second LED indicates the status of the D-channel interface.

The LEDs found on the NTRB21 DTI/PRI/DCH circuit card are described in the following table.

Table 9
NTRB21 LEDs

Affected circuit card	LED	State	Definition
NTRB21	DIS	On (Red)	NTRB21 circuit card is disabled.
		Off	NTRB21 is not in a disabled state.
	ACT	On (Green)	NTRB21 circuit card is in an active state. No alarm states exist, the card is not disabled, nor is it in a loopback state.
		Off	An alarm state or loopback state exists, or the card has been disabled. See other faceplate LEDs for more information.
	RED	On (Red)	A red-alarm state is detected.
		Off	No red alarm.
	YEL	On (Yellow)	A yellow alarm state is detected.
		Off	No yellow alarm.
	LBK	On (Green)	NTRB21 is in loopback mode.
		Off	NTRB21 is not in loopback mode.
	DCH	On (Red)	D-channel is equipped and disabled.
		On (Green)	D-channel is equipped and enabled.
		Off	D-channel is not equipped.

Table 9
NTRB21 LEDs (Continued)

Affected circuit card	LED	State	Definition
NTAK20	CC	On (Red)	NTAK20 is equipped and disabled.
		On (Green)	NTAK20 is equipped and is either locked to a reference or is in free run mode.
		Flashing (Green)	NTAK20 is equipped and is attempting to lock (tracking mode) to a reference. If the LED flashes continuously over an extended period of time, check the CC STAT in LD60. If the CC is tracking this may be an acceptable state. Check for slips and related clock controller error conditions. If none exist, then this state is acceptable, and the flashing is identifying jitter on the reference.
		Off	NTAK20 is not equipped.

Note: Only one of the five NTRB21 related LEDs should be on at any one time.

Monitor Jacks

The NTAK09, NTAK10, NTAK79, NTBK50, and NTRB21 have two bantam jacks (RCV and XMT) located on the faceplate. They may be used to monitor the performance of the carrier in the receive and transmit direction. The jacks allow the convenient connection of external T1/E1 test equipment and ISDN protocol analyzers.

Initialize button

Pressing the manual initialize button (button designated Man Int on the faceplate of the NTDK20 SSC and NTDK97 MSC cards) starts the Initialize Program which clears common equipment faults then rebuilds call-dependent data and generates system messages indicating the status of the system. This process is called an *initialization* (or INI). Call processing is briefly interrupted during an initialization.

System alarms

Major alarms

A major alarm indicates a fault which seriously interferes with call processing. The causes of major alarms are listed in Table 10.

When an Option 11C is equipped with a power fail transfer unit (PFTU), a major alarm causes designated 500-type or 2500-type telephones to connect directly to Central Office trunks; this is called a line transfer.

Minor alarms

A minor alarm indicates the system hardware or software has detected a fault requiring attention. The causes of minor alarms are listed in Table 10.

A minor alarm displays an alarm on attendant consoles in customer groups affected by the fault. (A minor alarm indication on the console is an optional feature, enabled and disabled on a customer basis through data administration procedures.)

Remote alarms

A remote alarm, in the context of general maintenance, is an extension of a major alarm on the Option 11C to another location or to an audible or visual indicator. The system generates a signal indicating it has a major alarm condition and sends it to a remote location, such as a monitoring center or test center, or to an indicator, such as a light or bell.

Table 10
Causes of major and minor alarms

Alarm	Cause
Major	CPU or control bus failure
	Data cartridge failure when attempting to load the system
	System power faults
	Temperature fault (excessive heat)
Minor	Conference failure
	Digitone receiver failure
	Memory failure
	More than one fault on different line and trunk cards in one cabinet (indicated on affected customer's console only)
	Network failure (indicated on affected customer's console only)
	Peripheral signaling failure
	Serial Data Interface failure
	Tone and digit switch failure

System monitor

The system monitor is an integral part of the cabinet power supply (NTAK04, NTAK05, NTDK72, or NTDK78 power supplies). It checks the cabinet temperature and system voltage status, and controls line transfer states accordingly.

The for Option 11C, the system monitor performs the following functions:

- If a circuit breaker in the system trips (for example, if there is a power surge or short circuit), the system monitor starts a line transfer and sends a remote alarm signal.
- If the temperature of the cabinet reaches 70 degrees C (158 degrees F), the system monitor trips the main circuit breaker in the cabinet, starts a line transfer, and sends a remote alarm signal.
- If the power supply loses +5 volts, the system monitor starts a line transfer and sends a remote alarm signal.
- If the power supply loses any voltage other than +5 volts, the system monitor sends a major alarm indication to the CPU, and sends an external alarm signal.
- If call processing stops, the system monitor starts a line transfer.

When major system failures occur, the system monitor sends an alarm signal. As an option, an indicator, such as a bell or light, can be connected to indicate the alarm condition.

Line transfer

As an option, you can connect one or more PFTUs to the system. Each PFTU connects designated 500-type or 2500-type telephones to Central Office trunks. If call processing stops, those 500/2500-type telephones are transferred through the PFTU to the Central Office so you still have outside connections. A line transfer occurs:

- during a sysload (system reload)
- if there is a major power failure
- if call processing stops due to a CPU failure
- if there is a loss of power to the cabinet
- if there is a loss of power to the PFTU
- if there is an over-temperature condition in a cabinet
- when the line transfer button on the attendant console is pressed (this applies on a customer basis)
- if a line transfer switch on the PFTU is turned on.

Power loss

The system monitor receives status and control signals from the external power distribution. The system monitor then generates system messages that indicate the status of main and reserve power supplies.

Main power loss

If the main power supply is lost, the system monitor generates a major alarm and system messages to indicate the system is running on reserve power.

Reserve power loss

With the exception of Option 11C Mini, you can connect a reserve (backup) power supply to the system, and the following equipment will be monitored by the Option 11C:

- NTAK28AA junction box breaker
- NTAK75AA reserve power supply breaker
- NTAK76AA reserve power supply breaker

Cabinet power supply failure

With the exception of Option 11C Mini, there are two types (AC/DC and DC) of cabinet power supplies:

- The NTAK04 or NTDK78 AC/DC power supply is used when the cabinet is powered by a commercial AC power source. The AC/DC power supply can also accommodate a reserve battery power supply.
- The NTAK05 or NTDK72 DC power supply is used when the cabinet is powered by a -52Vdc source.

The System Monitor handles complete or partial failures in a power supply as follows:

- If output voltage is higher than the threshold for +5 volts, the affected power supply shuts down, the major alarm is activated, and a system message is sent.
- If output voltage is higher than the threshold for other than +5 volts, power for only that voltage shuts down in the effected power supply, the major alarm is activated, and a system message is sent.

- If output voltage is lower than the threshold for any voltage, power for only that voltage shuts down in the effected power supply, the major alarm is activated, and a system message is sent.
- If input voltage is lower than the threshold, the effected power supply shuts down then recovers when the input level recovers.

Temperature alarms

If the temperature of the cabinet exceeds 70 degrees C (158 degrees F), the system monitor trips the main circuit breaker in the cabinet to prevent further overheating.

Chapter 4 — Software maintenance tools

Content list

The following are the topics in this section:

- Reference list 47
- Diagnostic programs 48
- Overlays 48
- Error Monitor 48
- Initialize Program 49
- Midnight and Background Routines 49
- Overlay Loader 51
- Overload Monitor 51
- Resident Trunk Diagnostic 51
- System Loader 51
- History File 52
- Interactive diagnostics 53
- Enhanced Maintenance 54

Reference list

The following are the references in this section:

- *X11 Administration* (553-3001-311)
- *X11 Maintenance* (553-3001-511)
- *X11 System Messages Guide* (553-3001-411)

Software maintenance tools help to identify and clear faults, and provide self-checking capabilities. Software maintenance tools are divided into the following categories:

- Diagnostic programs monitor a variety of operations, detect faults, and initiate corrective action during normal call processing.
- The History File records maintenance-related system messages.
- Interactive programs test hardware, isolate faults, and verify fault clearing.

Diagnostic programs

Diagnostic software programs monitor system operations, detect faults, and clear faults. Some programs run continuously, some are scheduled.

Diagnostic programs are *resident* or *nonresident* software programs. Resident programs, such as the Error Monitor and Resident Trunk Diagnostic, are always present in system memory. Nonresident programs, such as the Input/Output Diagnostic and Common Equipment Diagnostic, are used as Midnight and Background Routines or for interactive diagnostics. Nonresident programs are loaded from the system disk and are run as scheduled or upon request.

Overlays

Nonresident programs are also called overlays or loads. They are identified by a title and a number preceded by the mnemonic for load (for example, Trunk Diagnostic — LD 36).

See the *X11 Administration* (553-3001-311) *and X11 Maintenance* (553-3001-511) for detailed information on all diagnostic programs.

Error Monitor

The Error Monitor is a resident program which continuously tracks call processing. The Error Monitor generates system messages if it detects invalid or incorrectly formatted call processing information.

System messages generated by the Error Monitor are preceded by the mnemonic ERR, which usually indicates hardware faults, or the mnemonic BUG, which usually indicates software problems.

With prompt ERRM in the Configuration Record (LD 17), you can instruct the system to print or not print ERR or BUG messages. You should have BUG messages printed. If many similar BUG messages occur, consult your Technical Assistance Center.

Initialize Program

The Initialize Program momentarily interrupts call processing as it clears common equipment faults. It then rebuilds call-dependent data and generates system messages, with the mnemonic INI, which indicate the status of the system. This process is called an *initialization* (or *INI*).

You can activate an initialization by pressing the manual initialize:

- (Man Int) button on the NTDK20 SSC (Small System Controller) card
- (Man Int) button on the NTDK97 MSC (Mini System Controller) card

An initialization occurs automatically after the System Loader program runs, when a software or firmware fault is detected, and when a common equipment hardware fault is detected.

Midnight and Background Routines

In the Configuration Record (LD 17), you can select the nonresident software programs which will run in the *Midnight Routine* and *Background Routine.* These routines automatically perform maintenance checks. Programs included in the Midnight Routine are defined with the prompt DROL (derived from “daily routine overlay”). Programs included in the Background Routine are defined with the prompt BKGD.

The Midnight Routine runs once every 24 hours. This routine is preset to run at midnight when a system is shipped, but you may assign a different time in the Configuration Record. When it is time for the Midnight Routine to start, the system cancels any other program.

A memory test is run once a day. The Common Equipment Diagnostic (LD 35) runs as part of the Midnight Routine, even if it is not programmed.

The Background Routine runs when no other program is loaded in the overlay area. The programs included in the Background Routine run in sequence repeatedly until there is another request to use the overlay area (for example, if you log on to check the status of a circuit card) or the Midnight Routine runs.

You may include the programs listed in Table 11 in Midnight and Background Routines. Software Audit (LD 44), and Network and Signaling Diagnostic (LD 30) should always be used in the Background Routine.

Your maintenance requirements and the configuration of your system determine the other programs you include in Midnight and Background Routines.

Table 11
Programs used in Midnight and Background Routines

Program number	Program function
LD 30	Network and Signaling Diagnostic
LD 33	1.5 Mb/s Remote Peripheral Equipment Diagnostic
LD 34	Tone and Digit Switch and Digitone Receiver
LD 35	Common Equipment Diagnostic
LD 36	Trunk Diagnostic 1
LD 37	Input/Output Diagnostic
LD 38	Conference Circuit Diagnostic
LD 40	Call Detail Recording Diagnostic
LD 41	Trunk Diagnostic 2
LD 43 (Midnight only)	Data Dump
LD 44	Software Audit
LD 46	Multifrequency Sender Diagnostic
LD 60 (Midnight only)	Digital Trunk Interface Diagnostic
LD 61 (Midnight only)	Message Waiting Lamp
LD 135	Option 11C Common Equipment Diagnostic
LD 137	Option 11C Input/Output Diagnostic

Overlay Loader

This resident program locates, loads, and checks all nonresident software programs. It automatically activates the Midnight and Background Routines. You can load programs manually by entering commands through the system terminal or maintenance telephone. Once the program is loaded, you see the program mnemonic (such as TRK for Trunk Diagnostic) on the system terminal.

Overload Monitor

The volume of system messages is continuously monitored by the system. If too many error messages are detected from a line or trunk card, the system activates the Overload Monitor program. The Overload Monitor disables the faulty card and generates system messages with the mnemonic OVD.

Resident Trunk Diagnostic

This program automatically monitors all trunk calls and records apparent faults on each trunk. If the number of faults on a trunk exceeds the threshold for that trunk, the program generates a system message identifying the trunk and the type of fault.

A failure on a trunk may keep the trunk from detecting incoming calls. The threshold mechanism cannot detect such a failure, so this program also records how many days it has been since each trunk received an incoming call. If you suspect some incoming calls are not being processed, you can use the command LMAX in Trunk Diagnostic 1 (LD 36) to identify the trunk with the maximum idle days.

System Loader

The System Loader program loads all call processing programs and data, and starts memory-checking diagnostics. After all required programs and data have been loaded and all checks performed, the System Loader is erased from system memory, the Initialize Program runs, and normal call processing begins. This process is called a *sysload* (or *system reload*).

The System Loader operates automatically on system power up or if a common equipment or power fault destroys information in the system memory.

History File

If you have a printer connected to the system, each system message is printed as it is received. If you do not have a printer connected, you can use the History File (if equipped) to store a limited number of system messages in protected memory. The contents of the file may then be printed on demand, using LD 22.

The messages stored are specified on a system basis and can be one or more of the following types:

- customer service changes (CSC)
- maintenance messages
- service changes (SCH)
- software errors
- initialization and sysload messages
- traffic messages

For information on selecting the messages to be stored, see the *X11 Maintenance* (553-3001-511).

The contents of the History File are erased during a sysload or if you change the length of the History File. However, because the History File is located in protected data store, the contents survive an initialization.

You can change the length of the History File with the prompt HIST in the Configuration Record (LD 17). The maximum length of the file depends on the amount of protected data store available, which in turn depends on the number of system features that require protected data store.

If the History File is full, the first messages stored are replaced by incoming messages. If this happens, the system gives a “file overflow” message at the start of a printout so you know some information has been replaced by newer messages.

Interactive diagnostics

You can load nonresident software programs into memory through the system terminal or maintenance telephone. These programs, also called overlays or loads, are identified by a title and a number which is preceded by the mnemonic for load (for example, Trunk Diagnostic — LD 36).

The programs used in Midnight and Background Routines are also used manually as interactive diagnostic programs (see Table 11).

Nonresident programs are used interactively with a command and response format. In this format, you enter a command that tells the system to perform a specific task; the system performs the task and sends system messages indicating status or errors back to you.

With interactive diagnostics you can:

- disable, test, and enable specific equipment
- verify that a reported fault still needs to be cleared
- verify that a repair procedure has cleared a fault

All maintenance programs, commands, and system messages are described in detail in the *X11 Maintenance* (553-3001-511), *X11 System Messages Guide* (553-3001-411), and the *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

Enhanced Maintenance

System software sometimes requires modifications, called *patches* provided by Nortel Networks Technical Assistance Centers. The command ISS in Print Routine 3 (LD 22) prints the software generic and issue. A plus sign (+) by the issue number means there is a patch in service.

The Enhanced Maintenance feature:

- allows patches to automatically survive a sysload
- permits patches on nonresident programs
- records all patches in the system
- allows data cartridges to be shipped with pre-loaded patches

If there is a problem with a patch, the CPU sends system messages, with the mnemonic EHM, to the system terminal or the History File.

Chapter 5 — User reports

Reference list

The following are the references in this section:

- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)

Reports from system users often tell you about problems that may not be indicated by the system. Many faults reported by users, such as a damaged telephone or data set, are obvious and can be fixed by replacing the damaged equipment.

Some faults are less obvious and may be caused by other equipment, such as a defective peripheral equipment line or trunk card. To classify the fault in these cases, check for system messages and visual fault indications. You may also need to have the user reproduce the problem so you can determine the sequence of events that led to the fault.

User report indications

Table 12 lists problems that are typically reported by users.

Table 12
User report indications

User report	Type of fault
Major alarm reported by attendant No ring on 500/2500-type telephones	Power
Major alarm reported by attendant	Common equipment

Minor alarm reported by attendant Users cannot transfer or conference Users cannot dial out on 500/2500-type telephones	Network equipment
Trouble with calls on attendant console Trouble with calls on telephones	Peripheral equipment
Users have trouble with a specific trunk Callers report continuous ringing Trouble with calls on console and/or telephones	Trunk
Trouble with calls Trouble with equipment (such as handset, headset, or display)	Attendant console
Trouble with calls Trouble with equipment (such as handset or add-on module)	Telephone

ISDN BRI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

Chapter 6 — Technical assistance service

Content list

The following are the topics in this section:

- Nortel Networks Technical Assistance Centers 57
- Services available 59
- Requesting assistance 62

Nortel Networks Technical Assistance Centers

To help customers obtain maximum benefit, reliability, and satisfaction from their Meridian 1, Nortel Networks provides technical assistance in resolving system problems. This service is provided through the centers listed in Table 13.

Table 13
Customer Technical Services (CTS)

Location	Contact
Nortel Networks Corp. (CTS North America) 2100 Lakeside Blvd. Richardson, Texas, USA 75082	Telephone: 214-437-8282 Fax: 214-437-8913
Nortel Networks Corp. (CTS North America) P.O. Box 4000 250 Sydney Street Belleville, Ontario, Canada K8N 5B7	Telephone: 613-966-8181 Fax: 613-967-5360
Nortel Networks Corp. (CTS North America) 14701 NW 77th Avenue Miami, Florida, USA 33014	Telephone: 305-362-CTAS (2827) Fax: 305-526-8580
Nortel Networks Corp. (EUR) Saint Cloud Way Maidenhead, Berks, England SL6 8XB	Telephone: 753-81-3000 Fax: 628-21787
Nortel Networks Corp. (ASIA) 2 Leng Kee Road #03-01 Thye Hong Centre Singapore, Singapore 0315	Telephone: 65-287-2877 Fax: 65-4700-888
Nortel Property Ltd. (Australia) 17 Orion Road Lane Cove New South Wales, Australia 2066	Telephone: 2 428-8777 Fax: 2 428-8765
Nortel Networks Japan Inc. Headquarters Oak Minami-Azabu Building 19-23 Minami-Azabu 3 Chome-Minato-ku Tokyo, Japan 106	Telephone: 3 441-1811 Fax: 3 441-2380
Nortel Networks Meridian S.A. (France) Tour Gan 16 Place de l'Iris-Cedex 13 92082 Paris la Defense France	Telephone: 1 49 07 24 24 Fax: 1 49 01 01 89

Services available

Services available through the Technical Assistance Centers include:

- diagnosing and resolving software problems not covered by support documentation
- diagnosing and resolving hardware problems not covered by support documentation
- assisting in diagnosing and resolving problems caused by local conditions

There are several types of class-of-service available. Emergency requests (Class E1 and E2) receive an immediate response. Service for emergency requests is continuous until normal system operation is restored. Non-emergency requests (Class S1, S2, and NS) are serviced during normal working hours. Service classifications are described further in Tables 14 and 16.

Except as excluded by the provisions of warranty or other agreements with Nortel Networks, a fee for technical assistance may be charged, provided at rates established by Nortel Networks. Information on rates and conditions for services are available through Nortel Networks sales representatives.

Table 14
Technical service emergency classifications

Class	Degree of failure	Symptoms
E1	Major failure causing system degradation or outage	System out of service with complete loss of call-processing capability
		Loss of total attendant console capability
		Loss of incoming or outgoing call capability
		Loss of auxiliary Call Detail Reporting (CDR) in resale application
		Call processing degraded for reasons such as trunk group out of service
		• 10% or more lines out of service
		• Frequent initializations (seven per day or more)
		• inability to recover from initialization or sysload
		• consistently slow dial tone (eight seconds or more delay)
E2	Major failure causing potential system degradation or outage	Standby CPU out of service
		Frequent initializations (one per day or more)
		Disk drive failure
		Two sets of disks inoperative

Table 15
Technical services non-emergency classifications

Class	Degree of failure	Symptoms
S1	Failure which affects service	Software or hardware trouble directly and continuously affecting user's service or customer's ability to collect revenue
		Problem that will seriously affect service at in-service or cut-over date
S2	Intermittent failure which affects service	Software or hardware faults that only intermittently affect service
		System-related documentation errors which directly result in or lead to impaired service
NS	Failure which does not affect service	Documentation errors
		Software inconsistencies which do not affect service
		Hardware diagnostic failures (not defined above) which cannot be corrected by resident skills
		Test equipment failures for which a backup or manual alternative can be used
		Any questions concerning products

Requesting assistance

Collect the information listed in Table 16 before you call for service.

Table 16
Checklist for service requests

Name of person requesting service	_____
Company represented	_____
Telephone number	_____
System option number/identification	_____
Installed software generic and issue (located on data disk)	_____
Modem telephone number and password (if applicable)	_____
Seriousness of request (see Tables 14 and 15)	_____
Description of assistance required	_____

_____

_____

_____

Chapter 7 — How to clear faults

Content list

The following are the topics in this section:

- Reference list 63
- Fault clearing process 63
- How to clear faults 64

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- “Fault indicators” on page 67
- “Final maintenance procedure” on page 225

Fault clearing process

When a fault must be cleared in the Option 11C, follow these steps:

- Observe and record all fault indicators.
- System messages, visual fault indicators and user reports identify many problems. If the indicators are not current or seem incomplete, you may need to print the History File for previous messages, you may need to initialize the system for information on the current status, or both.
- Look up all system messages in the *X11 System Messages Guide* (553-3001-411).

The interpretation of the message may identify faulty equipment and tell you what action to take to clear the problem. If you cannot clear the fault through information in the *X11 System Messages Guide* (553-3001-411), follow the process in this chapter to isolate and clear the fault.

- Try to enable or test disabled equipment.

> **CAUTION**
> Wear the antistatic wrist strap, provided in each cabinet, when handling circuit cards to prevent damage caused by static discharge.

- You may be able to hardware re-enable circuit cards by unseating then reinstalling them. You may be able to software re-enable cards by disabling then re-enabling them. When the cause of a fault is not clearly evident, a software test may help you identify the problem.
- Replace equipment as necessary.

How to clear faults

To clear faults in the Option 11C system, follow the steps below:

1 Classify the fault by the indicators present (see“Fault indicators” on page 67. When there are indications of multiple faults, clear them in the following order:

a Power faults

b Common Equipment faults

c Network faults

d Peripheral Equipment faults

e Trunk faults

f Attendant console faults

g Telephone faults

Note: Always clear possible power faults then Common Equipment faults before any other type of fault.

2 Go to the chapter for clearing the type of fault identified. There is a chapter for each type of fault listed above (for example, *Clearing power faults*. As closely as possible, match the problem to a symptom listed in the chapter.

3 Go through the procedure for clearing each possible cause of the problem until the fault is cleared.

4 When the fault is corrected, follow the instructions in Final maintenance procedure on “Final maintenance procedure” on page 225 to completely restore normal operation.

End of Procedure

Chapter 8 — Fault indicators

Content list

The following are the topics in this section:

- Reference list 67
- System messages 67
- Visual fault indicators 69
- User reports 70

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)

When there is a fault in the system, you may be notified by any combination of the following indicators:

- system messages
- visual fault indicators
- user reports

Each type of indicator is described below.

System messages

System messages are codes with a mnemonic and number, such as OVD021. The mnemonic identifies a software program or a type of message. The number identifies the specific message. Use system messages with other indicators, such as visual indicators, to identify and clear faults.

Table 17 lists the most common fault indicating messages and the type of fault they indicate. For a complete list and interpretation of system messages, see the *X11 System Messages Guide* (553-3001-411).

Table 17
System message fault indicators and related fault types

System messages	Type of fault
BSD90 messages	Power
CCED messages CED messages CIOD messages HWR messages INI001, 002, 004, 005, 007 IOD006, 007, 060, 061, 291—297 NWS030, 102, 103, 142 SYS messages	Common Equipment
CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 008—012 NWS101, 141, 201—204, 301, 401 OVD021, 022, 023, 031 SYS4696 TDS messages XMI messages	Network
ERR4062 NWS301, 401, 501 OVD001—010, 024 XMI messages	Peripheral Equipment
ERR090, 220, 270 OVD001—010 TRK messages	Trunk
ERR500 MWL500 NWS501 OVD001—010	Telephone

Visual fault indicators

There are visual indicators that can help you identify faults. These indicators include:

- A major alarm display: indicates a possible power, Common Equipment, or Network fault
- Circuit card Light Emitting Diodes (LEDs): indicates a card or a unit on a circuit card is disabled

Table 18 lists visual indicators you may see and the type of fault they might indicate for Option 11C systems.

Table 18
Visual fault indicators and related fault types for Option 11C

Indicator	Type of fault
Green LED off on a power supply Circuit breaker tripped (down) Remote alarm	Power
Red LED lit on CE card	Common Equipment
Minor alarm on an attendant console	Network
Red LED lit on associated card	Peripheral Equipment
Red LED lit on trunk card	Trunk
Red LED lit on associated cards	Attendant console
Red LED lit on associated cards	Telephone
Sync LED on Fbr Rcvr card	Fbr Rcvr card or Fiber cable

User reports

Many faults reported by users, such as a damaged telephone or data set, are obvious and can be fixed by replacing the damaged equipment.

Some faults are less obvious and may be caused by other equipment, such as a defective Peripheral Equipment circuit card. To classify the fault in these cases, check for system messages and visual fault indications. You may also have the user reproduce the problem so you can determine the sequence of events that led to the fault.

Table 19 lists typical problems reported by users and the type of fault they might indicate.

Table 19
User reported problems and related fault types

User report	Type of fault
An alarm reported by attendant	Power
An alarm reported by attendant	Common Equipment
An alarm reported by attendant Cannot transfer or conference Cannot dial out on 500/2500-type telephones	Network
Trouble with calls on attendant console Trouble with calls on telephones	Peripheral Equipment
Trouble with a specific trunk Continuous ringing Trouble with calls on console and/or telephones	Trunk
Trouble with calls Trouble with equipment (such as handset, headset, or display)	Attendant console
Trouble with calls Trouble with equipment (such as handset or add-on module)	Telephone

Chapter 9 — Accessing the system

Content list

The following are the topics in this section:

- Reference list 71
- Access through the system terminal 71
- Access through the maintenance telephone 73

Reference list

The following are the references in this section:

- *X11 Administration* (553-3001-311)

When replacing equipment, you will send maintenance commands to the system software to disable faulty equipment and to software enable and test newly installed equipment.

You send maintenance commands to the system through the system terminal or the maintenance telephone. This chapter gives the procedures for accessing the system through these devices.

Access through the system terminal

You can send maintenance commands and receive system messages by accessing the CPU through an RS-232 device, such as a video display terminal (VDT) or teletypewriter (TTY).

When you access the system through a system terminal, a log in procedure is required. All system passwords are initially set as 0000, but you can change passwords through the Configuration Record (LD 17).

If a sysload (system reload) occurs before you save a new password in a data dump, the last active password remains valid.

Each system has two levels of passwords: level 1 is for general use, level 2 is for administrative use. Either password is accepted in the log in procedure.

Accessing the system from a system terminal

1 Press the return key.

— If the response is
OVL111 nn IDLE or **OVL111 nn BKGD**
you are ready to log into the system. Go to Step 2.

— If the response is
OVL000 >
you are already logged into the system. Go to Step 4.

Responses vary with different Background Terminal packages.

2 Enter
LOGI
then press the return key.

The normal response is
PASS?
If there is any other response, see the *X11 Administration* (553-3001-311).

3 Enter either the level 1 or level 2 password and press the return key. If the password is correct, the system responds with the prompt
>

4 Enter
LD xx
"xx" represents the number of the program.

5 Perform tasks.

6 End the program by entering
****

7 End the log in session with
LOGO

End of Procedure

Access through the maintenance telephone

A telephone functions as a maintenance telephone when you define the class-of-service as MTA (maintenance telephone allowed) in the Telephones program (LD 11).

A maintenance telephone allows you to send commands to the system, but you can only use a subset of the commands that can be entered from a system terminal. The maintenance telephone, however, takes priority over a system terminal and will log the terminal out.

You can test tones and outpulsing through the maintenance telephone. Specific commands for those tests are given in the Tone and Digit Switch and Digitone Receiver Diagnostic (LD 34).

You can test trunk connections through the maintenance telephone. Specific commands for those tests are given in the Trunk Diagnostic (LD 36).

No log in procedure is required when you access the system through a maintenance telephone. To enter commands, press the keys that correspond to the letters and numbers of the command (for example, to enter *LD 42 return*, key in *53#42##*). Table 20 shows the translation from a terminal keyboard to a telephone dial pad.

To use the maintenance telephone, the Terminal Number (TN) for that telephone must be operating.

Table 20
Translation from keyboard to dial pad

Keyboard				Dial Pad
			1	1
A	B	C	2	2
D	E	F	3	3
G	H	I	4	4
J	K	L	5	5
M	N	O	6	6
P	R	S	7	7
T	U	V	8	8
W	X	Y	9	9
			0	0
		Space or #		#
		Return		##
Note: There is no equivalent for Q or Z on a dial pad.				

Accessing the maintenance telephone

1 Press the prime DN key.

2 Place the telephone in maintenance mode by entering
xxxx91
"xxxx" represents the customer Special Prefix (SPRE) number. It is defined in the Customer Data Block and can be printed using LD 21. The SPRE number is typically "1" (which means you would enter *191*).

3 Check for busy tone by entering
******

- If there is no busy tone, go to Step 4.
- If there is a busy tone, a program is active. To end an active program and access the system, enter
  ****

4 Load a program by entering
53#xx##
"xx" represents the number of the program.

5 Perform tasks.

6 Press the release key to return the telephone to call processing mode. Background routines are then loaded automatically.

End of Procedure

Chapter 10 — Clearing power faults

Content list

The following are the topics in this section:

- Reference list 77
- Power faults 77
- Fault clearing procedures 79
- Main circuit breaker off and all LEDs off 84
- Circuit breaker on the power supply in the cabinet is on but all LEDs in the cabinet are off 85
- Circuit breaker on the NTAK28 Junction Box is tripped 87
- Circuit breaker on the NTAK75 or NTAK76 Battery Box is tripped 89

Reference list

The following are the references in this section:

- *Option 11C Planning and Installation* (553-3021-210)
- “How to clear faults” on page 63
- “Replacing equipment” on page 187
- “Final maintenance procedure” on page 225

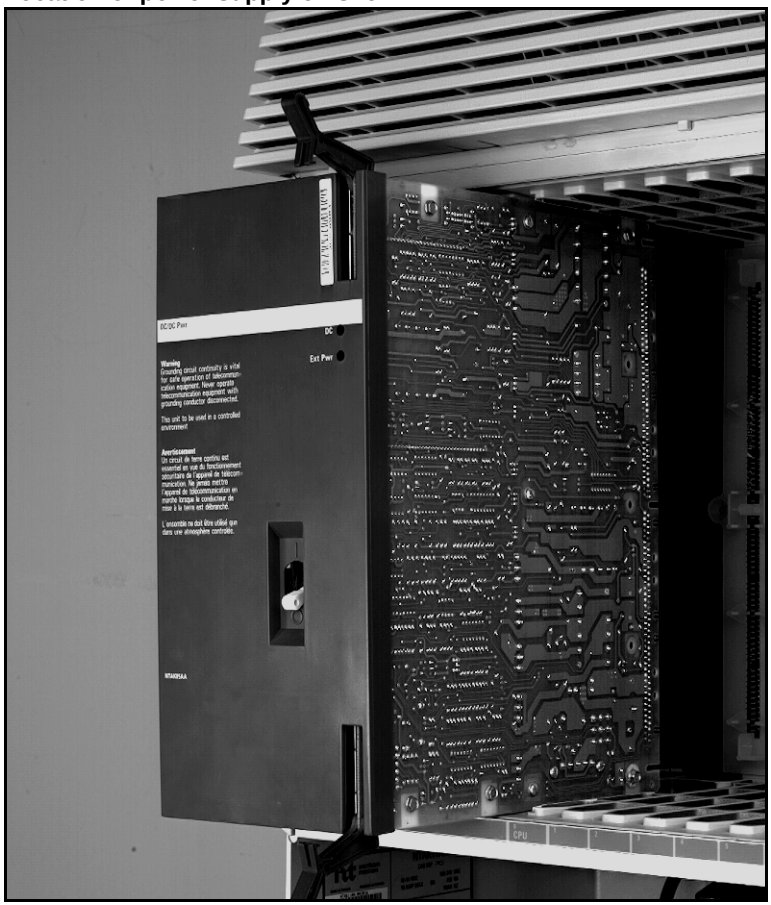
Power faults

Option 11C: The various electrical voltages required to power the system, including ringing voltages for Analog 500- and 2500-type telephones and to light message waiting lamps on 2500-type telephones, are provided by a power supply located in each cabinet.

The power supply is located in the extreme left shelf position in each cabinet as shown in Figure 3.

Option 11C Mini: For Option 11C Mini, the power supply is internal to the chassis. The chassis will have to be replaced in the case of power supply or fan failure.

Figure 3
Location of power supply on shelf


DC/DC Pwr
DC
Ext Pwr
Warning
Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with grounding conductor disconnected.
This unit to be used in a controlled environment
Avertissement
Un circuit de terre continu est essentiel en vue du fonctionnement sécuritaire de l'appareil de télécommunication. Ne jamais mettre l'appareil de télécommunication en marche lorsque le conducteur de mise à la terre est débranché.
L'ensemble ne doit être utilisé que dans une atmosphère contrôlée.
CPU

Fault clearing procedures

System messages with the mnemonic BSD090 contain power related information. They identify the type of equipment generating the message.

Table 21 shows the power messages output for Option 11C systems

Table 21
Option 11C BSD power messages

BSD090 message	Affected equipment
BSD090 MAIN-PWR	Power fault in the main cabinet.
BSD090 MAIN-MAIL	Power fault with the Meridian Mail equipment in the main cabinet. (Refer to your Meridian Mail documentation to fix this problem.)
BSD090 MAIN-BATT	Battery box breaker not switched on or battery cable fault in main cabinet.
BSD090 EXPN-PWR	Power fault in the expansion cabinet. ***Note:*** This message is only output on systems using the backwards compatible expansion daughter board.
BSD090 EXPANSION CABINET 1 - PWR	Power fault in expansion cabinet 1.
BSD090 EXPANSION CABINET 1 - BATT	Battery box breaker not switched on or battery cable fault in expansion cabinet 1.
BSD090 EXPANSION CABINET 2- PWR	Power fault in expansion cabinet 2.
BSD090 EXPANSION CABINET 2- BATT	Battery box breaker not switched on or battery cable fault in expansion cabinet 2.
BSD090 EXPANSION CABINET 3- PWR	Power fault in expansion cabinet 3.
BSD090 EXPANSION CABINET 3- BATT	Battery box breaker not switched on or battery cable fault in expansion cabinet 3.
BSD090 EXPANSION CABINET 4- PWR	Power fault in expansion cabinet 4.
BSD090 EXPANSION CABINET 4- BATT	Battery box breaker not switched on or battery cable fault in expansion cabinet 4.

Table 21
Option 11C BSD power messages (Continued)

BSD090 message	**Affected equipment**
BSD MAIN CAB PWR OK	The power fault in the main cabinet no longer exists.
BSD EXPANSION CABINET 1 POWER OK	The power fault in the expansion cabinet 1 no longer exists.
BSD EXPANSION CABINET 2 POWER OK -	The power fault in the expansion cabinet 2 no longer exists.
BSD EXPANSION CABINET 3 POWER OK -	The power fault in the expansion cabinet 3 no longer exists.
BSD EXPANSION CABINET 4 POWER OK -	The power fault in the expansion cabinet 4 no longer exists.
BSD90 message multiple problem format This format is used to indicate more than one problem, and is output for both main and expansion cabinets**.**	**Affected equipment**
BSD090 MAIN-PWR MAIN-BATT MAIN-MAIL	Power fault, fault in the main cabinet junction box, the battery box or interconnecting wiring, and a Meridian Mail power fault in the main cabinet.
BSD090 MAIN-PWR EXPN-PWR MAIN-BATT MAIN-MAIL	The main cabinet has a power fault, a fault in the main cabinet junction box, the battery box or interconnecting wiring, and a Meridian Mail power fault, while the expansion cabinet has a power fault. ***Note:*** This message indicates faults on systems using the NTDK26 Backwards Compatible Daughter Board.
BSD090 EXPANSION CABINET 1 - PWR BATT	The expansion cabinet has a power fault, a fault in the junction box, and the battery box breaker not switched on or battery cable fault.

Table 22
11C Mini BSD power messages

BSD090 message	Affected equipment
BSD090 MAIN CAB PWR	Power fault in the main chassis.
BSD090 MAIN CAB-EXP-PWR	Power fault in the chassis expander.
BSD090 EXPANSION CABINET 1 - PWR	Power fault in expansion chassis or chassis expander.
BSD090 EXPANSION CABINET 1 - BATT	Mini expansion chassis 1 powered down.
BSD090 EXPANSION CABINET 2- PWR	Power fault in expansion chassis or chassis expander.
BSD090 EXPANSION CABINET 2- BATT	Mini expansion chassis 2 powered down.
BSD090 EXPANSION CABINET 3- PWR	Power fault in expansion chassis or chassis expander.
BSD090 EXPANSION CABINET 3- BATT	Mini expansion chassis 3 powered down.
BSD090 EXPANSION CABINET 4- PWR	Power fault in expansion chassis or chassis expander.
BSD090 EXPANSION CABINET 4- BATT	Mini expansion chassis 4 powered down.
BSD MAIN CAB PWR OK	The power fault in the main chassis no longer exists.
BSD MAIN CAB PWR OK	The power fault in the expansion chassis no longer exists.

Table 22
11C Mini BSD power messages (Continued)

BSD090 message	Affected equipment
BSD EXPANSION CABINET 1 POWER OK -	The power fault in the expansion chassis 1 or its chassis expander no longer exists.
BSD EXPANSION CABINET 2 POWER OK -	The power fault in the expansion chassis 2 or its chassis expander no longer exists.
BSD EXPANSION CABINET 3 POWER OK -	The power fault in the expansion chassis 3 or its chassis expander no longer exists.
BSD EXPANSION CABINET 4 POWER OK -	The power fault in the expansion chassis 4 or its chassis expander no longer exists.
BSD90 message multiple problem format This format is used to indicate more than one problem, and is output for both main and expansion cabinets**.**	**Affected equipment**

Table 23 lists common power fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications then go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

You must clear power faults before you try to clear other types of faults in the system. You must clear power faults in the main cabinet before clearing power faults in expansion cabinets.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 63 to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards and power supplies are in the chapter titled “Replacing equipment” on page 187. Additional information can be found in the *Option 11C Planning and Installation* (553-3021-210).

After the fault is corrected, go to “Final maintenance procedure” on page 225 to completely restore normal operation.

Table 23
Power fault indications

Indicator	Possible indications
System messages	BSD090 messages
Visual indicators	Alarms Green LED off on cabinet power supply LED lit on PFTU Circuit breaker tripped (down) Remote alarm
User reports	Difficulty reported by attendant No ring on 500/2500-type telephones

Symptom:

Main circuit breaker off and all LEDs off

All the LEDs in the system are off and the circuit breaker on the power supply in the cabinet is tripped. Use this procedure to clear the problem.

High room temperature or a power surge can shut down the system. Check for these external conditions and if present, correct them then reset the breaker.

You may need to replace:

- the NTAK04, NTAK05, NTDK72 or NTDK78 power supply
- the NTDK20 SSC (Small System Controller) card (if the fault is in the main cabinet), or the NTDK97 MSC (Mini System Controller) card (if the fault is in the Option 11C Mini main chassis).
- any one of the remaining circuit cards in the affected cabinet

Table 24
Main circuit breaker off and all LEDs off

Possible cause	Action
Thermal overload	Make sure nothing is blocking ventilation throughout the system. Allow the system to cool for a few minutes then reset the breaker. If the breaker trips, go to the next possible cause.
Defective circuit card in the cabinet	Unseat all the circuit cards in the cabinet except the power supply. Reset the breaker. If the breaker trips, the power supply is defective. Remove the existing power supply and install a new one. For Option 11C Mini, replace the chassis. If the breaker does not trip, reinstall the circuit cards one-at-a-time until the breaker trips.

Symptom:

Circuit breaker on the power supply in the cabinet is on but all LEDs in the cabinet are off

All the LEDs in the cabinet are off but the circuit breaker on the Power Supply Unit in the cabinet is not tripped. Use this procedure to clear the problem.

You may need to replace the:

- Power Supply: NTAK04, NTAK05, NTDK72, or NTDK78
- Main AC Power Supply Cord (AC powered cabinet without battery backup)
- Main DC Power Supply Cord on DC powered systems (no AC power supply)
- Uninterruptible Power Supply (UPS) on an AC powered cabinet without battery backup
- Chassis for the Option 11C Mini

Table 25
Circuit breaker on the power supply in the cabinet is on but all LEDs in the cabinet are off

Possible cause	Action
Main Power Cord not connected (AC or DC powered cabinet without battery backup)	If the main power cord for the cabinet is unplugged, plug it in. Check both ends of the cord to make sure that it is also plugged in to the power supply unit. If the power cord is already plugged in, go to the next possible cause.
WARNING **The following tests are performed on a live power connection.**	
No power at outlet (AC or DC powered cabinet without battery backup)	With a meter or test lamp, test for power at the outlet. If there is no power at the outlet when AC power is supplied through a UPS unit, repair or replace the UPS following the manufacturer's instructions. If there is no power at the outlet when AC power is supplied through commercial service (not through a UPS), take the necessary steps to have the commercial power restored. If there is no power at the outlet when DC power is supplied from an external source, take the necessary steps to have the DC power restored. If there is power at the outlet, go to the next possible cause.
Defective Main Power Cord	With a meter or test lamp, test the cabinet end of the main power cord (at the bottom of the Power Supply Unit in the cabinet) for power. If there is no power, replace the power cord. If there is power at the connections, go to the next possible cause.
Defective Power Supply Unit	Replace the NTAK04, NTAK05, NTDK72 or NTDK78 Power Supply Unit, or for the Option 11C Mini, replace the chassis.

Symptom:

Circuit breaker on the NTAK28 Junction Box is tripped

While operating the Option 11C from the reserve power supply, the circuit breaker on the NTAK28 junction box is tripped. Call processing has stopped.

You may need to replace the:

- NTAK0410 Power Cable
- QBL24A1 Battery Box
- NTAK04, NTAK05, NTDK72 or NTDK78 Power Supply
- NTAK28 Junction Box

Table 26
Circuit breaker on the NTAK28 Junction Box is tripped

Possible cause	Action
The NTAK28 terminal block wiring may be incorrect.	Check the wiring according to the Option 11C Installation guide.
The NTAK0410 Power Cable may be defective	Reset the breaker on the NTAK28 Junction Box. If it trips, replace the NTAK0410 Power Cable between the NTAK28 Junction Box and the NTAK04, NTAK05, NTDK72 or NTDK78 Power Supply in the cabinet. If the breaker trips when reset, go to the next possible cause.
The NTAK04, NTAK05, NTDK72 or NTDK78 Power Supply in the cabinet may be defective	Replace the Power Supply in the cabinet. Reset the circuit breaker on the NTAK28 Junction Box (if equipped). If the breaker trips when reset, go to the next possible cause.
The QBL24A1 Battery Box may be defective.	Replace the entire Battery Box unit. Do not attempt to disassemble the QBL24A1. It contains no user serviceable parts and there is risk of electric shock.
The NTAK28 Junction Box is defective	Replace the NTAK28 Junction Box

Symptom:

Circuit breaker on the NTAK75 or NTAK76 Battery Box is tripped

To diagnose the cause of this circuit breaker being tripped, first verify the conditions with the battery breaker OFF, and then verify conditions with the battery breaker ON. You may need to replace the:

- NTAK0410 Power Cable
- NTAK75 or NTAK76 Batteries
- NTAK04 or NTDK78 Power Supply
- NTAK75 or NTAK76 Battery Box

With battery breaker OFF

The circuit breaker on the NTAK75 or NTAK76 Battery Box is tripped. With the battery breaker OFF, the following condition should exist:

- the Battery Box LED is ON,
- the NTAK04, or NTDK78 DC LED is ON, and
- the NTAK04 or NTDK78 BATT LED is OFF.

Table 27
Circuit breaker on the NTAK75 or NTAK76 Battery Box is tripped with battery breaker OFF

Possible cause	Action
The battery wiring may be incorrect.	Verify the wiring according to the Option 11C Installation guide.
The NTAK0410 connections at the Option 11C Power Supply (NTAK04 or NTDK78) and Battery Box may be incorrect	Verify the connections according to the Option 11C Installation guide.
The NTAK0410 Power Cable may be defective.	Replace the cable if one of the following conditions exists: - the Battery Box LED is OFF, or - the NTAK04 or NTDK78 DC LED is OFF, or - the NTAK04 or NTDK78 BATT LED is ON
The NTAK75/76 Battery Box may be defective.	Replace the NTAK75/76 Battery Box if the NTAK0410 Power Cable has been replaced above, and the following conditions exist: - the Battery Box LED is OFF, and - the NTAK04 or NTDK78 DC LED is ON, and - the NTAK04 or NTDK78 BATT LED is OFF
The NTAK04 or NTDK78 Power Supply may be defective	Replace the Power Supply if the NTAK0410 Power Cable has been replaced above, and one of the following conditions exists: - the NTAK04 or NTDK78 DC LED is OFF, or - the NTAK04 or NTDK78 BATT LED is ON

With battery breaker ON

The circuit breaker on the NTAK75/76 Battery Box is tripped. With the battery breaker ON, the following condition should exist:

- the Battery Box LED is ON,
- the NTAK04 or NTDK78 DC LED is ON, and
- the NTAK04 or NTDK78 BATT LED is ON.

Table 28
Circuit breaker on the NTAK75 or NTAK76 Battery Box is tripped with battery breaker ON

Possible cause	Action
A transient fault caused the breaker to trip.	Reset the breaker.
Batteries may be defective.	If the breaker trips after resetting it in the step above, replace the batteries then reset the breaker.
The NTAK75/76 Battery Box may be defective.	If the breaker trips again after replacing the batteries in the step above, replace the NTAK75/76 Battery Box, then reset the breaker.

Chapter 11 — Clearing Common Equipment faults

Content list

The following are the topics in this section:

- Reference list 93
- Common Equipment faults 94
- Fault clearing procedures 96
- ISDN and DTI faults 97
- Call processing stopped on the entire system 97
- Fault indicated on the CPU circuit card, or Memory fault indicated 101
- Fault indicated on the Tone and Digit Switch 104
- Fault indicated when trying to perform a data dump 106
- OVL005 message displayed and no access to overlays 107

Reference list

The following are the references in this section:

- “How to clear faults” on page 63
- “Replacing equipment” on page 187
- “Final maintenance procedure” on page 225
- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C Planning and Installation* (553-3021-210)

- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Common Equipment faults

Common Equipment (CE) functions perform system control and switching. Common Equipment, located on the NTBK45 SYST CORE card, NTDK20 SSC (Small System Controller) card, or NTDK97 MSC (Mini System Controller) card can include:

For the NTDK20 (Option 11C)

- CPU: Comprised of two processors. The main processor handles call processing, serial ports, and network traffic. The auxiliary processor handles card polling, power monitoring, tone generation, and control of a Digital Signal Processor (DSP) for tone detection.
- Fiber Expansion Daughter Board: provides 16 additional conference channels per expansion cabinet and access to expansion cabinet hardware
- Backwards Compatible Daughter Board: provides an upgrade path for existing expansion cabinet installations
- Software Daughter Board: provides storage for system software
- Ethernet controller: provides one port between the CPU and a Local Area Network (LAN)
- Serial Data Interface: provides three ports between the CPU and external devices
- Personal Computer Memory Card Industry Association (PCMCIA) interface: provides access for one Type III or two Type II PCMCIA card drives to allow software delivery or customer data storage
- Tone and Digit Switch: provides 30 channels of tone generation
- Digitone Receiver: provides eight DTR/XTD units with an additional user selectable eight DTR/XTD units or four MFC, MFE, MFK5, MFK6, or MFR units
- Conference: provides 32 channels, plus:

— 16 with each Single Port Fiber Expansion Daughter Board equipped

— 32 with each Dual Port Fiber Expansion Daughter Board equipped

Common Equipment faults can disable the CPU and stop call processing. In addition, other types of equipment (such as Peripheral Equipment) may not operate properly while there is a CE fault in the system.

For the NTDK97 (Option 11C Mini)

- CPU: Comprised of two processors. The main processor handles call processing, serial ports, and network traffic. The auxiliary processor handles card polling, power monitoring, tone generation, and control of a Digital Signal Processor (DSP) for tone detection. On board Flash memory provides 16M of storage for system software.
- Ethernet controller: provides one port between the CPU and a Local Area Network (LAN)
- Serial Data Interface: provides three ports between the CPU and external devices
- Personal Computer Memory Card Industry Association (PCMCIA) interface: provides access for one Type III or two Type II PCMCIA card drives to allow software delivery or customer data storage
- Tone and Digit Switch: provides 30 channels of tone generation
- Digitone Receiver: provides eight DTR/XTD units with an additional user selectable eight DTR/XTD units or four MFC, MFE, MFK5, MFK6, or MFR units
- Conference: provides 16 channels:

Common Equipment faults can disable the CPU and stop call processing. In addition, other types of equipment (such as Peripheral Equipment) may not operate properly while there is a CE fault in the system.

CAUTION

Wear the grounded wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

Fault clearing procedures

Table 29 lists Common Equipment (CE) fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power faults before you try to clear Common Equipment faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check "How to clear faults" on page 63 to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards and power supplies are in the chapter titled "Replacing equipment" on page 187. Additional information can be found in the *Option 11C Planning and Installation* (553-3021-210).

After the fault is corrected, go to "Final maintenance procedure" on page 225 to completely restore normal operation.

Table 29
Common Equipment fault indications

Indicator	Possible indications
System messages	CCED messages CED messages CIOD messages HWR messages INI001, 002, 004, 005, 007 IOD006, 007, 060, 061, 291—297 NWS030, 102, 103, 142 SYS messages
Visual indicators	Major alarm on attendant consoles Red LED lit on NTDK20 SSC circuit card NTDK97 MSC circuit card
User reports	Major alarm reported by attendant

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

1.5 Mb ISDN or DTI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

2.0 Mb ISDN or DTI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Symptom:

Call processing stopped on the entire system

Call processing has stopped. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

- For systems equipped with a NTDK20 SSC (Small System Controller) card
  - NTAK04 or NTDK78 Power Supply
  - NTAK05 or NTDK72 Power Supply
  - NTDK20 SSC (Small System Controller) card
  - NTDK21 or NTDK81 Software Daughter Board
  - NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
  - NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
  - NTDK26 Backwards Compatible Daughter Board
  - Main Cabinet
- For systems equipped with a NTDK97 MSC (Mini System Controller) card:
  - NTDK97 MSC
  - Main chassis

Table 30
NTDK20 causes and actions

Possible cause	Action
Improperly installed NTDK21 or NTDK81 Software Daughter Board	Unseat the NTDK20 SSC (Small System Controller) card. Unseat the Software Daughter Board. Reseat the Software Daughter Board. Ensure Daughter Board connector is fully seated. Reinsert the NTDK20 SSC circuit card.
Improperly installed NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board	Unseat the NTDK20 SSC (Small System Controller) card. Unseat the Fiber Daughter Board. Reseat the Fiber Daughter Board. Ensure Daughter Board connector is fully seated. Reinsert the NTDK20 SSC circuit card.
Improperly installed NTDK26 Backwards Compatible Daughter Board	Unseat the NTDK20 SSC (Small System Controller) card. Unseat the Backwards Compatible Daughter Board. Reseat the Backwards Compatible Daughter Board. Ensure Daughter Board connector is fully seated. Reinsert the NTDK20 SSC circuit card.
Defective NTAK04 or NTDK78 or NTDK72 or NTAK05 Power Supply in the main cabinet	Make sure the green LED on the Power Supply in the main cabinet is lit. If it is not lit, go to “Clearing power faults.” If the power supply LED is lit, go to the next possible cause.

Table 30
NTDK20 causes and actions (Continued)

Possible cause	Action
Initialization required	Press the manual initialize button on the faceplate of the NTDK20 SSC (Small System Controller) card. If the system initializes, check all fault indicators and clear any faults indicated. If the system does not initialize, unseat the circuit cards in the main cabinet (and in the expansion cabinet if equipped) one-at-a-time starting with slot 1. If the system initializes, replace the last circuit card you removed (it may be faulty). If the system will not initialize, go to the next possible cause.
Defective NTDK20 SSC (Small System Controller) card	Replace the NTDK20 SSC circuit card with the original Daughter Boards installed on it. If the system does not recover, go to the next possible cause.
Defective NTDK26 Backwards Compatible Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Backwards Compatible Daughter Board. Reinsert the NTDK20 SSC circuit card. If a sysload (reload) occurs, check all fault indicators and clear any faults indicated. If the system will not reload, go to the next possible cause.
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Fiber Daughter Board. Reinsert the NTDK20 SSC circuit card. If a sysload (reload) occurs, check all fault indicators and clear any faults indicated. If the system will not reload, go to the next possible cause.

Table 30
NTDK20 causes and actions (Continued)

Possible cause	Action
Defective NTDK21 or NTDK81 Software Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Software Daughter Board. Reinsert the NTDK20 SSC circuit card. Reinstall software form PCMCIA card as necessary. If the system will not reload, go to the next possible cause.
Defective backplane	Replace the cabinet.

Table 31
NTBK97 causes and actions

Possible cause	Action
Initialization required	Press the manual initialize button on the faceplate of the NTDK97 MSC (Mini System Controller) card. If the system initializes, check all fault indicators and clear any faults indicated. If the system does not initialize, unseat the circuit cards in the main chassis (and in the chassis expander if equipped) one-at-a-time starting with slot 1. If the system initializes, replace the last circuit card you removed (it may be faulty). If the system will not initialize, go to the next possible cause.
Defective NTDK97 MSC (Mini System Controller) card	Replace the NTDK97 MSC circuit card. If the system does not recover, go to the next possible cause.
Defective power supply, fan, or backplane	Replace the chassis.

Symptom:

Fault indicated on the CPU circuit card, or Memory fault indicated

The red LED is lit on the CPU circuit card, or a memory fault is indicated. Look up all system messages in the *X11 Maintenance* (553-3001-511) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- For systems equipped with a NTDK20 SSC (Small System Controller) card
  - NTDK20 SSC (Small System Controller) card
  - NTTK13 Software Daughter Board
  - NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
  - NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
  - NTDK26 Backwards Compatible Daughter Board
- For systems equipped with a NTDK97 MSC (Mini System Controller) card
  - NTDK97 MSC (Mini System Controller) card

Table 32
NTDK20 causes and actions

Possible cause	Action
Improperly installed NTTK13 Software Daughter Board	Power down the system, remove the NTDK20 SSC (Small System Controller) card. Unseat the Software Daughter Board and then reseat it. Reinsert the NTDK20 SSC circuit card. Power up the system.

Table 32
NTDK20 causes and actions (Continued)

Possible cause	Action
Improperly installed NTDK26 Backwards Compatible Daughter Board	Power down the system, remove the NTDK20 SSC circuit card. Unseat the Backwards Compatible Daughter Board and then reseat it. Reinsert the NTDK20 SSC circuit card. Power up the system.
Improperly installed NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board	Power down the system, remove the NTDK20 SSC (Small System Controller) card. Unseat the Fiber Daughter Board and then reseat it. Reinsert the NTDK20 SSC circuit card. Power up the system.
Defective NTDK20 SSC (Small System Controller) card	Replace the NTDK20 SSC circuit card with the original daughter boards installed on it. ***Note:*** Reuse all daughter boards installed on the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. If the system does not recover, go to the next possible cause.
Defective NTTK13 Software Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Software Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Reinsert the NTDK20 SSC circuit card. If the system will not reload, go to the next possible cause.

Table 32
NTDK20 causes and actions (Continued)

Possible cause	Action
Defective NTDK26 Backwards Compatible Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Backwards Compatible Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Reinsert the NTDK20 SSC circuit card. If the system will not reload, go to the next possible cause.
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board	Unseat the NTDK20 SSC circuit card and replace the Fiber Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Reinsert the NTDK20 SSC circuit card. If the system will not reload, go to the next possible cause.

Table 33
NTDK97 causes and actions

Possible cause	Action
Defective NTDK97 MSC (Mini System Controller) card	Replace the NTDK97 MSC circuit card. ***Note:*** Call processing on the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced.

Symptom:

Fault indicated on the Tone and Digit Switch

The red LED is lit on the CPU circuit card, or a Tone and Digit Switch fault is indicated. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- NTDK20 SSC (Small System Controller) card
- NTDK97 MSC (Mini System Controller) card

Table 34
NTDK20 causes and actions

Possible cause	Action
Defective Tone and Digit Switch circuitry	Test the Tone and Digit Switch and (Digitone Receiver) on the NTDK20 SSC (Small System Controller) card by entering **LD 34** **DISX 0** and then **ENLX 0** finally **STAT 0.** If the Digitone Receiver fails the test, replace the NTDK20 SSC circuit card. ***Note:*** Reuse all daughter boards installed on the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. If the system does not recover, go to the next possible cause.

Table 35
NTDK97 causes and actions

Possible cause	Action
Defective Tone and Digit Switch circuitry	Test the Tone and Digit Switch and (Digitone Receiver) on the NTDK97 MSC (Mini System Controller) card by entering **LD 34** **DISX 0** and then **ENLX 0** finally **STAT 0.** If the Digitone Receiver fails the test, replace the NTDK97 MSC circuit card. ***Note:*** Call processing on the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. If the system does not recover, go to the next possible cause.

Symptom:

Fault indicated when trying to perform a data dump

You are able to log onto the system but you get an error message when trying to perform a data dump.

Table 36
NTDK20 causes and actions

Possible cause	Action
Corrupted data on Software Daughter Board	Perform an **EDD NBK** command in **LD 43** to restore the data.
Manual initialize button pressed when performing a backup using the Customer Configuration Backup and Restore feature.	While still in remote backup mode, issue an **ENLT** command.
Security failure during an upgrade.	Re-enter the keycodes. ***Note:*** Up to three invalid keycodes may be entered. After the third invalid keycode, all changes are lost and the Setup Program returns to the main menu.

Table 37
NTDK97 causes and actions

Possible cause	Action
Corrupted data on MSC	Perform an **EDD NBK** command in **LD 43** to restore the data.
Manual initialize button pressed when performing a backup using the Customer Configuration Backup and Restore feature.	While still in remote backup mode, issue an **ENLT** command.
Security failure during an upgrade.	Re-enter the keycodes. ***Note:*** Up to three invalid keycode may be entered. After the third invalid keycode, all changes are lost and the Setup Program returns to the main menu.

Symptom:

OVL005 message displayed and no access to overlays

This fault will occur if you press the manual initialize button on the SSC or MSC when performing a data backup, restore, or verification using the Customer Configuration Backup and Restore (CCBR) feature.

When you log back onto the system after completing the remote backup activity, you find you are unable to access overlays and an OVL005 message is displayed.

Table 38
OVL005 message displayed and no access to overlays

Possible cause	Action
Manual initialize button pressed when using the CCBR feature	After logging onto the system, issue the **ENLT** command at the TTY.

Chapter 12 — Clearing Network faults

Content list

The following are the topics in this section:

- Reference list 109
- Network faults 110
- Fault clearing procedures 111
- ISDN and DTI faults 112
- Disabled card indicated by OVD message 113
- Card disabled without OVD message 119
- Problems with transferring, placing conference calls, or Music-on-Hold 125
- Problems placing calls on 2500-type telephones and some trunks 129

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)
- *Option 11C Mini Planning and Installation* (553-3021-209)
- *Option 11C Planning and Installation* (553-3021-210)

- "How to clear faults" on page 63
- "Replacing equipment" on page 187
- "Final maintenance procedure" on page 225

Network faults

Network functions in the Option 11C are an integral part of the NTDK20 SSC (Small System Controller) card and NTDK97 MSC (Mini System Controller) card. These cards provide speech path switching and transmit and receive signaling messages from the CPU. Network functions include:

NTDK20 (Option 11C)

- Conference/Tone and Digit Switch: combines the functionality of Conference by providing 32 channels of conferencing and 30 channels of tone generation. Each Fiber Expansion daughterboard connected to the SSC provides an additional 16 Conference channels per port (16 channels with each Single Port daughterboard and 32 channels with each Dual Port daughterboard).
- SSC (Small System Controller) circuit card: provides the digital switching and conferencing for the system
- Tone Digit Switch/Digitone Receiver: provides 30 channels of tone generation for the system and eight DTR/XTD units with an additional user selectable eight DTR/XTD units or four MFC, MFE, MFK5, MFK6, or MFR units converts multi-frequency dialing signals.
- Serial Data Interface: provides the interface for up to three Input/Output device ports from the Small System Controller card
- Ethernet controller: provides one port between the CPU and a Local Area Network (LAN)

Network faults can cause system initializations and disable conference capability or all terminal connections (such as trunks and telephones) on a card. Network faults can make functional Peripheral Equipment seem faulty.

NTDK97 (Option 11C Mini)

- Conference (Tone and Digit Switch): combines the functionality of Conference which provides 16 channels, Tone and Digit Switch, and multi-frequency Sender which provides 30 channels of tone generation.

- MSC (Mini System Controller) circuit card: provides the digital switching and conferencing for the system
- Tone Digit Switch/Digitone Receiver: provides 30 channels of tone generation for the system and eight DTR/XTD units with an additional user selectable eight DTR/XTD units or four MFC, MFE, MFK5, MFK6, or MFR units converts multi-frequency dialing signals.
- Serial Data Interface: provides the interface for up to three Input/Output device ports from the Mini System Controller (MSC) card
- Ethernet controller: provides one port between the CPU and a Local Area Network (LAN)

Network faults can cause system initializations and disable conference capability or all terminal connections (such as trunks and telephones) on a card. Network faults can make functional Peripheral Equipment seem faulty.

Fault clearing procedures

Manual Continuity Tests can be used to isolate Network faults and Peripheral Equipment faults. See “LD 30” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Table 39 lists common Network fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power or Common Equipment faults before you try to clear Network faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 63 to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards and power supplies are in “Replacing equipment” on page 187. Additional information can be found in the *Option 11C Mini Planning and Installation* (553-3021-209) or the *Option 11C Planning and Installation* (553-3021-210).

After the fault is corrected, go to “Final maintenance procedure” on page 225 to completely restore normal operation.

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

1.5 Mb ISDN or DTI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

2.0 Mb ISDN or DTI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Table 39
Network fault indicators

Indicator	Possible indications
System messages	CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 008—012 NWS101, 141, 201—204, 301, 401 OVD021, 022, 023, 031 SYS messages TDS messages XCT messages XMI messages
Visual indicators	Minor alarm on an attendant console Red LEDs lit or flashing on circuit cards
User reports	Minor alarm reported by attendant Users cannot transfer or conference Users cannot dial out on 500/2500-type telephones No dial tone at all sets; no display on digital sets

CAUTION
Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

Symptom:

Disabled card indicated by OVD message

An overload (OVD) message indicates a network (loop) disabled. The network (loop) number in the Option 11C system corresponds to the slot number in the cabinet. All terminal connections on the loop are disabled.

Test the card by entering:

LD 30
TEST
If the card tests "OK" the problem has cleared. If an "OVD" message appears after a few minutes, use this procedure.

Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual Continuity Tests can be used to isolate Network and Peripheral Equipment faults. See "LD 30" in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace some of the following equipment:

- For Option 11C
  - NTAK1204 Expansion cabinet cable
  - NTAK1205 Expansion cabinet cable
  - Peripheral Equipment (PE) circuit card

— Cabinet

- For Option 11C Mini
  - — NTDK95 Expansion cable
  - — Peripheral Equipment (PE) circuit card
  - — Chassis
- For systems equipped with a NTDK20 SSC (Small System Controller) card
  - — A0632902 Fiber cable (10 m)
  - — NTDK20 SSC (Small System Controller) card
  - — NTDK21 or NTDK81 Software Daughter Board
  - — NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
  - — NTDK23 10 m Fbr Rcvr (Fiber Receiver) card
  - — NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
  - — NTDK25 or NTDK80 3 km Fbr Rcvr (Fiber Receiver) card
  - — NTDK26 Backwards Compatible Daughter Board
- For systems equipped with a NTDK97 MSC (Mini System Controller) card
  - — NTDK97 MSC (Mini System Controller) card

Table 40
Mini System

Possible cause	Action
Defective NTDK95 cable if affected card is in chassis expander.	Replace the NTDK95 cable labeled DS-30X.

Table 41
NTDK20 causes and actions

Possible cause	Action
Defective NTDK23 or NTDK25 or NTDK80 Fbr Rcvr (Fiber Receiver) card if affected card is in Expansion cabinet	Replace the NTDK23 or NTDK25 or NTDK80 Fbr Rcvr. ***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr (Fiber Receiver) card is being replaced. Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains and the Fbr Rcvr is a: NTDK23 replace the Fiber cable NTDK25 or NTDK80 have the fiber connection tested.
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the Fiber Daughter Board (NTDK22 [10 m Fiber Daughter Board] or NTDK24 or NTDK79 [3 km Fiber Daughter Board] on the NTDK20 SSC circuit card. ***Note:*** Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated.

Table 41
NTDK20 causes and actions (Continued)

Possible cause	Action
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the NTDK20 SSC circuit card.
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board if affected card is in Expansion cabinet	Replace the Fiber Daughter Board on the NTDK20 SSC circuit card. ***Note:*** Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. If the fault remains and the Daughter Board is a: NTDK22, NTDK84 replace the Fiber cable NTDK24, NTDK79, NTDK85 have the fiber connection tested.
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the NTDK23 or NTDK25 or NTDK80 Fbr Rcvr. ***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr (Fiber Receiver) card is being replaced. If the fault remains replace the NTDK20 SSC circuit card.

Table 41
NTDK20 causes and actions (Continued)

Possible cause	Action
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4
Defective NTDK26 Backwards Compatible Daughter Board if affected card is in Expansion cabinet	Replace the NTDK26 Backwards Compatible Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Enable and test the card by entering **LD 30** **TEST** If the problem persists replace the NTDK20 SSC circuit card.
Defective NTDK20 SSC (Small System Controller) card	Install a new NTDK20 SSC (Small System Controller) card. ***Note:*** Reuse the daughter boards attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. Enable and test the card by entering **LD 30** **TEST** Wait for an OVD message. If the card tests “OK”, the NTDK20 SSC circuit card was defective. If after a few minutes you receive an OVD message, and this system is not equipped with an expansion cabinet, the shelf backplane is defective. Replace the main cabinet. If this system is equipped with an expansion cabinet, go to the next possible cause.
Defective Expansion cabinet	Replace cabinet. Enable and test the card by entering **LD 30** **TEST** If problem persists replace defective main cabinet

Table 42
NTDK97 causes and actions

Possible cause	Action
Defective NTDK97 MSC (Mini System Controller) card	Install a new NTDK97 MSC (Mini System Controller) card. ***Note:*** Call processing on the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. Enable and test the card by entering **LD 30** **TEST** Wait for an OVD message. If the card tests “OK”, the NTDK97 MSC circuit card was defective. If after a few minutes you receive an OVD message, and this system is not equipped with a chassis expander, the backplane is defective. Replace the main chassis. If this system is equipped with a chassis expander, go to the next possible cause.
Defective chassis expander	Replace chassis. Enable and test the card by entering **LD 30** **TEST** If problem persists replace defective main chassis.

Symptom:

Card disabled without OVD message

There is a system message indicating one or more cards are defective or disabled, but there is no overload (OVD) message indicating disabled equipment. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- NTAK1204 Expansion cabinet cable
- NTAK1205 Expansion cabinet cable
- NTDK95 chassis expander cable (Option 11C Mini)
- Peripheral Equipment (PE) circuit card
- The shelf backplane and cabinet
  - — For systems equipped with a NTDK20 SSC (Small System Controller) card (Option 11C)
- A0632902 Fiber cable (10 m)
- NTDK20 SSC (Small System Controller) card
- NTTK13 Software Daughter Board
- NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
- NTDK23 10 m Fbr Rcvr (Fiber Receiver) card
- NTDK24 or NTDK79 or NTDK85 3 km Fiber Daughter Board
- NTDK25 or NTDK80 3 km Fbr Rcvr (Fiber Receiver) card
- NTDK26 Backwards Compatible Daughter Board
  - — For systems equipped with a NTDK97 MSC (Mini System Controller) card (Option 11C Mini)
- NTDK97 MSC (Mini System Controller) card

Table 43
All systems causes and actions

Possible cause	Action
PE card circuitry latched	Disable card, reseat card and enable the card. If the fault persists, go to the next possible cause.
Defective PE circuit card	Replace the PE circuit card. Enable and test the card by entering **LD 30** **TEST** If the fault persists, go to the next possible cause.
Defective terminal equipment	Check all terminals (such as telephones or trunks) connected to the PE circuit card. Enable and test the card by entering **LD 30** **TEST** If the fault is not located, go to the next possible cause.
Defective NTAK1204 or NTAK1205 Expansion cabinet cable, or Defective NTDK95 chassis expander cable	Replace the cable between the main and expansion cabinets or chassis expander. ***Note:*** Call processing for the Expansion cabinet or chassis expander will be interrupted while the cable is replaced. Enable and test the card by entering **LD 30** **TEST** If the fault persists, go to the next possible cause.
Twenty five pair cable seating	Check for obstructions, clear if any and reseat cable. If the fault persists, go to the next possible cause.

Table 44
NTDK20 causes and actions

Possible cause	Action
Defective NTDK23 or NTDK25 or NTDK80 Fbr Rcvr (Fiber Receiver) card if affected card is in Expansion cabinet	Replace the NTDK23 or NTDK25 or NTDK80 Fbr Rcvr. ***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr (Fiber Receiver) card is being replaced. Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains and the Fbr Rcvr is a: NTDK23 replace the Fiber cable NTDK25 or NTDK80 have the fiber connection tested. Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the Fiber Daughter Board (NTDK22 [10 m Fiber Daughter Board] or NTDK24 or NTDK79 [3 km Fiber Daughter Board] on the NTDK20 SSC circuit card. ***Note:*** Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated.

Table 44
NTDK20 causes and actions (Continued)

Possible cause	Action
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the NTDK20 SSC circuit card.
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board if affected card is in Expansion cabinet	Replace the Fiber Daughter Board on the NTDK20 SSC circuit card. ***Note:*** Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. If the fault remains and the Daughter Board is a: NTDK22, NTDK84 replace the Fiber cable NTDK24, NTDK79, NTDK85 have the fiber connection tested. Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4 If the fault remains replace the NTDK23 or NTDK25 or NTDK80 Fbr Rcvr. ***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr (Fiber Receiver) card is being replaced. If the fault remains replace the NTDK20 SSC circuit card.

Table 44
NTDK20 causes and actions (Continued)

Possible cause	Action
	Enable the fiber link by entering **LD 135** **ENL FIL 1** if the fault is in Expansion cabinet 1 OR **ENL FIL 2** if the fault is in Expansion cabinet 2 OR **ENL FIL 3** if the fault is in Expansion cabinet 3 OR **ENL FIL 4** if the fault is in Expansion cabinet 4
Defective NTDK26 Backwards Compatible Daughter Board	Replace the NTDK26 Backwards Compatible Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Enable and test the card by entering **LD 30** **TEST** If the problem persists replace the NTDK20 SSC circuit card.
Defective NTDK20 SSC (Small System Controller) card	Install a new NTDK20 SSC (Small System Controller) card. ***Note:*** Reuse the daughter boards attached to the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. Enable and test the card by entering **LD 30** **TEST** If the card tests “OK”, the NTDK20 SSC circuit card was defective. If after a few minutes the problem recurs, and this system is not equipped with an expansion cabinet, the shelf backplane is defective. Replace the main cabinet. If this system is equipped with an expansion cabinet, go to the next possible cause.
Defective Expansion cabinet	Replace cabinet if the affected PE card is in this cabinet. Enable and test the card by entering **LD 30** **TEST** If problem persists got to next possible cause

Table 44
NTDK20 causes and actions (Continued)

Possible cause	Action
Defective Main cabinet	Replace cabinet.

Table 45
NTDK97 causes and actions

Possible cause	Action
Defective NTDK97 MSC (Mini System Controller) card	Install a new NTDK97 MSC (Mini System Controller) card. ***Note:*** Call processing on the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. Enable and test the card by entering **LD 30** **TEST** If the card tests “OK”, the NTDK97 MSC circuit card was defective. If after a few minutes the problem recurs, and this system is not equipped with a chassis expander, the backplane is defective. Replace the main chassis. If this system is equipped with a chassis expander, go to the next possible cause.
Defective chassis expander	Replace chassis if the affected PE card is in this chassis. Enable and test the card by entering **LD 30** **TEST** If problem persists got to next possible cause
Defective main chassis	Replace chassis.

Symptom:

Problems with transferring, placing conference calls, or Music-on-Hold

Several users cannot transfer or place conference calls, or calls do not receive Music-on-Hold. A circuit card that provides conference capability may be disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- For systems equipped with a NTDK20 SSC (Small System Controller) card (Option 11C)
  - NTDK20 SSC (Small System Controller) card
  - NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
  - NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
  - NTDK26 Backwards Compatible Daughter Board
  - Telephone
- For systems equipped with a NTDK97 MSC (Mini System Controller) card (Option 11C Mini)
  - NTDK97 MSC (Mini System Controller) card
  - Telephone

Table 46
NTDK20 causes and actions

Possible cause	Action
Defective NTDK26 Backwards Compatible Daughter Board	If a fault is indicated on conference loop 31, replace the Backwards Compatible Daughter Board. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated.
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Daughter Board	If a fault is indicated on conference loop 31, replace the Fiber Daughter Board for Expansion cabinet 1. If a fault is indicated on conference loop 62, replace the Fiber Daughter Board for Expansion cabinet 2. ***Note:*** Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is unseated.
Defective NTDK20 SSC (Small System Controller) card	If there are no messages indicating a fault on any conference loop, test each conference loop in the system by entering **LD 38** **CNFC loop** **(“loop” represents the conference loop number 29, 30, 31 or 62)** If the conference loop is disabled, try to enable it by entering **LD 38** **ENLL loop** **(“loop” represents the conference loop number 29, 30, 31 or 62)**

Table 46
NTDK20 causes and actions (Continued)

Possible cause	Action
	If a fault is indicated on conference loop 31, replace the Backwards Compatible Daughter Board or the Fiber Daughter Board for Expansion cabinet 1. If a fault is indicated on conference loop 62, replace the Fiber Daughter Board for Expansion cabinet 2. If a fault is indicated on conference loop 29 or 30, replace the NTDK20 SSC circuit card. ***Note:*** Reuse the daughter boards installed on the original NTDK20 SSC circuit card. Call processing on the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. If no faults are detected on any conference loop, go to the next possible cause.
Defective telephone	Check the telephone with this problem. Make sure that the feature is properly assigned to the telephone and the telephone is not defective.

Table 47
NTDK97 causes and actions

Possible cause	Action
Defective NTDK97 MSC (Mini System Controller) card	If there are no messages indicating a fault on conference loop 29, test the conference loop in the system by entering **LD 38** **CNFC 29** If the conference loop is disabled, try to enable it by entering **LD 38** **ENLL 29** If a fault is indicated on conference loop 29, replace the NTDK97 MSC circuit card. ***Note:*** Call processing on the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. If no faults are detected on the conference loop, go to the next possible cause.
Defective telephone	Check the telephone with this problem. Make sure that the feature is properly assigned to the telephone and the telephone is not defective.

Symptom:

Problems placing calls on 2500-type telephones and some trunks

Several users of 2500-type telephones report trouble placing calls. Other users may report trouble dialing on certain trunks. A Digitone Receiver or a circuit card that provides Tone and Digit Switch capability may be disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- NTAK03 TDS/DTR circuit card
- NTDK20 SSC (Small System Controller) card (Option 11C)
- NTDK97 MSC (Mini System Controller) card (Option 11C Mini)

Table 48
Problems placing calls on 2500-type telephones and some trunks

Possible cause	Action
Disabled Digitone Receiver	Check for disabled Digitone Receiver TNs by entering **LD 34** **STAT** If any are disabled, try to enable them by entering **ENLX c u** **("c u" represents card and unit number)** If the Digitone Receiver will not enable, go to the next possible cause.

Table 48 (Continued)
Problems placing calls on 2500-type telephones and some trunks

Possible cause	Action
Defective Digitone Receiver	Test the Digitone Receiver on the NTAK03 TDS/DTR by entering **DTR c u** Test the (Tone and Digit Switch) and Digitone Receiver on the NTBK45 SYST CORE, NTDK20 SSC, or NTDK97 MSC card by entering **DISX 0** and then **ENLX 0.** If the Digitone Receiver fails the test, replace the SYST CORE circuit card, SSC circuit card, MSC circuit card, or if applicable, the NTAK03 TDS/DTR circuit card. If the Digitone Receiver passes the test, go to the next possible cause.
Digitone Receiver not configured or hardware missing	Check for Digitone Receiver TNs by entering **LD 20** **LTN** **DTR** If no Digitone Receiver configured, use. **LD 13** If the Digitone Receiver configured, check to see if DTR card installed Install card if necessary. If above possibilities not causing problems, go to the next possible cause.
Telephone problem	Check the telephone with this problem. Make sure that the class-of-service (DTN) is properly assigned to the telephone and the telephone is not defective.

Chapter 13 — Clearing Peripheral Equipment faults

Content list

The following are the topics in this section:

- Reference list 131
- Peripheral Equipment faults 132
- Fault clearing procedures 132
- ISDN and DTI faults 134
- Disabled Peripheral Equipment circuit card 135
- More than one Peripheral Equipment circuit card disabled 139

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)
- *Option 11C Mini Planning and Installation* (553-3021-209)
- *Option 11C Planning and Installation* (553-3021-210)
- “How to clear faults” on page 63

- "Replacing equipment" on page 187
- "Final maintenance procedure" on page 225

Peripheral Equipment faults

Peripheral Equipment (PE) provides the interface between Network switching and terminal equipment (such as trunks, telephones, data sets, and attendant consoles). Peripheral Equipment faults can disable network and terminal equipment.

Fault clearing procedures

Manual Continuity Tests can be used to isolate Peripheral Equipment faults.

System messages with the mnemonic BSD665 are output for systems equipped with the following hardware:

- NTDK20 SSC (Small System Controller) card
- NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
- NTDK23 10 m Fbr Rcvr (Fiber Receiver) card

and/or

- NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
- NTDK25 or NTDK80 3 km Fbr Rcvr (Fiber Receiver) card

The messages contain fiber interface related information. They identify the link and its state. Table 49 shows the Fiber Interface messages output and their meaning.

Table 50 lists common Peripheral Equipment (PE) fault indications (many other system messages may be generated). To clear faults, select the symptom listed in this chapter that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power or Common Equipment faults before you try to clear peripheral equipment faults.

Table 49
Fiber Interface messages

BSD655 message	Problem
BSD655 FIBER 1 LINK DOWN	Expansion cabinet 1 Fiber Interface Link is down.
BSD655 FIBER 1 LINK ESTABLISHED	Expansion cabinet 1 Fiber Interface Link is reestablished.
BSD655 FIBER 2 LINK DOWN	Expansion cabinet 2 Fiber Interface Link is down.
BSD655 FIBER 2 LINK ESTABLISHED	Expansion cabinet 2 Fiber Interface Link is reestablished.
BSD655 FIBER 3 LINK DOWN	Expansion cabinet 3 Fiber Interface Link is down.
BSD655 FIBER 3 LINK ESTABLISHED	Expansion cabinet 3 Fiber Interface Link is reestablished.
BSD655 FIBER 4 LINK DOWN	Expansion cabinet 4 Fiber Interface Link is down.
BSD655 FIBER 4 LINK ESTABLISHED	Expansion cabinet 4 Fiber Interface Link is reestablished.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 63to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards and power supplies are described in “Replacing equipment” on page 187. Additional information can be found in the *Option 11C Mini Planning and Installation* (553-3021-209) or the *Option 11C Planning and Installation* (553-3021-210).

After the fault is corrected, go to “Final maintenance procedure” on page 225 to completely restore normal operation.

Table 50
Peripheral Equipment fault indicators

Indicator	Possible indications
Sample system messages	BSD655 FIBER 1 LINK DOWN BSD655 FIBER 2 LINK DOWN BSD655 FIBER 3 LINK DOWN BSD655 FIBER 4 LINK DOWN ERR4062 NWS301, 401, 501 OVD001—010, 024 XMI messages
Visual indicators	Red LEDs lit on circuit cards
User reports	Trouble with calls on attendant console Trouble with calls on telephones

CAUTION
Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

For 1.5 Mb ISDN, DTI or PRI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

For 2.0 Mb ISDN, DTI or PRI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Symptom:

Disabled Peripheral Equipment circuit card

A Peripheral Equipment (PE) circuit card is disabled, the red LED the PE circuit card is lit, or two or more units on a circuit card are disabled. There is a system message indicating the circuit card or units on it are disabled. Only one PE circuit card is affected. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- NTAK1204 Expansion cabinet cable (Option 11C)
- NTAK1205 Expansion cabinet cable (Option 11C)
- NTDK95 Chassis expander cable (Option 11C Mini)
- Peripheral Equipment (PE) circuit card

For systems equipped with NTDK20 SSC (Small System Controller) card

- NTDK20 SSC (Small System Controller) card
- NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
- NTDK23 10 m Fbr Rcvr (Fiber Receiver) card
- NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
- NTDK25 or NTDK80 3 km Fbr Rcvr (Fiber Receiver) card

For systems equipped with NTDK97 MSC (Mini System Controller) card

- NTDK97 MSC (Mini System Controller) card

Table 51
All systems causes and actions

Possible cause	Action
Defective PE circuit card	Replace the affected circuit card. Enable the circuit card by entering **LD 32** **ENLC c** **("c" represents the card number)** Test the card by entering **LD 30** **UNTT c** ("c" represents the card number)
Defective NTAK1204, or NTAK1205 Expansion cabinet cable if affected card is in Expansion cabinet	***Note:*** Call processing for the Expansion cabinet will be interrupted while the Expansion cabinet cable is being replaced. Disable the Expansion cabinet by entering: **LD 32** **DISS x** where x is the number for the Expansion cabinet 1 or 2 Enable the Expansion cabinet by entering: **LD 32** **ENLS x** where x is the number for the Expansion cabinet 1 or 2 Test the circuit card by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the expansion cabinet)
Defective NTDK95 chassis expander cable	If the affected card is in the chassis expander, replace the NTDK95 cable connecting the DS 30x connectors. If the affected card is the NT6R16 Meridian Mail Mini card, replace both NTDK95 cables connecting the main chassis to the chassis expander.

Table 52
NTDK20 (Option 11C) causes and actions

Possible cause	Action
Defective NTDK23 or NTDK 25 or NTDK80 Fbr Rcvr card if affected card is in Expansion cabinet	***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr card is being replaced. Disable the Expansion cabinet by entering: **LD 32** **DISS x** where x is the number for the Expansion cabinet 1 through 4 Disable the Fiber Link by entering: **LD 135** **DIS FIL x** where x is the number for the Expansion cabinet 1 through 4 Replace the Fbr Rcvr card.
	Perform Local and Remote Loop-back tests on the link by entering: **LD 135** **LLBK FIL x** where x is the number for the Expansion cabinet 1 through 4 **RLBK FIL x** Enable the Fiber Link by entering: **LD 135** **ENL FIL x** where x is the number for the Expansion cabinet 1 through 4 Enable the Expansion cabinet by entering: **LD 32** **ENLS x** where x is the number for the Expansion cabinet 1 through 4

Table 52
NTDK20 (Option 11C) causes and actions (Continued)

Possible cause	Action
Defective NTDK22 or NTDK24 or NTDK79 or NTDK84 or NTDK85 Fiber Expansion Daughter Board if affected card is in Expansion cabinet	Replace the Fiber Expansion Daughter Board on the NTDK20 SSC circuit card. ***Note:*** Call processing for the entire system will be interrupted while the NTDK20 SSC circuit card is unseated. Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Enable the circuit card by entering **LD 32** **ENLC c** **("c" represents the card number)** Test the circuit card by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the expansion cabinet)
Defective NTDK20 SSC (Small System Controller) card	Replace the NTDK20 SSC (Small System Controller) card. ***Note:*** Call processing for the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. Reuse the Software Daughter Board and the other Fiber Daughter Board, if equipped, attached to the original NTDK20 SSC circuit card. Test the circuit card by entering **LD 30** **UNTT c** **("c" represents the card number)**

Table 53
NTDK97 (Option 11C Mini) causes and actions

Possible cause	Action
Defective NTDK97 MSC (Mini System Controller) card	Replace the NTDK97 MSC (Mini System Controller) card. ***Note:*** Call processing for the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. Test the circuit card by entering **LD 30** **UNTT c** **("c" represents the card number)**

Symptom:

More than one Peripheral Equipment circuit card disabled

More than one Peripheral Equipment circuit card, or two or more units on different circuit cards, are disabled in the same cabinet. There is a system message indicating the circuit cards or units on the circuit cards are disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual Continuity Tests can be used to isolate Intelligent Peripheral Equipment faults. See "LD 30" in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

For systems equipped with NTDK20 SSC (Small System Controller) card

- A0632902 Fiber Cable (10 m) Plastic
- NTDK20 SSC (Small System Controller) card
- NTDK22 or NTDK84 10 m Fiber Expansion Daughter Board
- NTDK23 10 m Fbr Rcvr (Fiber Receiver) card

- NTDK24 or NTDK79 or NTDK85 3 km Fiber Expansion Daughter Board
- NTDK25 or NTDK80 3 km Fbr Rcvr (Fiber Receiver) card
- NTDK26 Backwards Compatible Daughter Board

For systems equipped with NTDK97 MSC (Mini System Controller) card

- NTDK97 MSC (Mini System Controller) card

Table 54
NTDK20 (Option 11C) causes and actions

Possible cause	Action
If the PE circuit card is in an expansion cabinet, the NTAK1204 or NTAK1205 copper cable may be defective	***Note:*** Call processing for the Expansion cabinet will be interrupted while the cable is being replaced. Disable the Expansion cabinet by entering: **LD 32** **DISS x** where x is the number for the Expansion cabinet 1 or 2 Replace the fiber cable. Enable the Expansion cabinet by entering: **LD 32** **ENLS x** where x is the number for the Expansion cabinet 1 or 2 Test the circuit cards by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the expansion cabinet)

Table 54
NTDK20 (Option 11C) causes and actions (Continued)

Possible cause	Action
If the PE circuit card is in an expansion cabinet, the fiber cable may be defective	***Note:*** Call processing for the Expansion cabinet will be interrupted while the Fbr Rcvr card is being replaced. Disable the Expansion cabinet by entering: **LD 32** **DISS x** where x is the number for the Expansion cabinet 1 through 4 Disable the Fiber Link by entering: **LD 135** **DIS FIL x** where x is the number for the Expansion cabinet 1 through 4 Replace the fiber cable. Perform Local and Remote Loop-back tests on the link by entering: **LD 135** **LLBK FIL x** where x is the number for the Expansion cabinet 1 through 4 **RLBK FIL x** Enable the Fiber Link by entering: **LD 135** **ENL FIL x** where x is the number for the Expansion cabinet 1 through 4 Enable the Expansion cabinet by entering: **LD 32** **ENLS x** where x is the number for the Expansion cabinet 1 through 4 Enable the circuit card by entering **LD 32** **ENLC c** **(“c” represents the card number)** Test the circuit card by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the expansion cabinet)

Table 54
NTDK20 (Option 11C) causes and actions (Continued)

Possible cause	Action
Fiber link problems	Replace the Fbr Rcvr (Fiber Receiver) card or Fiber Expansion Daughter Board especially if BSD655 messages have been output indicating there is a problem.
Defective PE circuit card	Replace the affected circuit cards. Enable the circuit card by entering **LD 32** **ENLS x** (**x** represents the shelf number; **0** for the main cabinet, **1** for the first expansion cabinet, **2** for the second expansion cabinet, **3** for the third expansion cabinet and **4** for the fourth expansion cabinet.) Test the circuit card by entering **LD 30** **TEST**
Keyword is invalid	To input proper keyword, use **LD 97** **REQ** **TYPE** **ISM** **KEY 1** **KEY 1** **KEY 1** Enable the circuit cards by entering **LD 32** **ENLC c** **(“c” represents the card number)** Test the circuit cards by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the expansion cabinet)

Table 54
NTDK20 (Option 11C) causes and actions (Continued)

Possible cause	Action
Defective NTDK20 SSC circuit card	Replace the NTDK20 SSC circuit card. ***Note:*** Call processing for the entire system will be interrupted while the NTDK20 SSC circuit card is being replaced. Reuse the daughter boards attached to the original NTDK20 SSC circuit card. Test the circuit cards by entering **LD 30** **TEST**

Table 55
NTDK97 (Option 11C Mini) causes and actions

Possible cause	Action
If the PE circuit card is in a chassis expander, the NTDK95 copper cable may be defective	Replace the NTDK95 cable connecting the DS 30x connectors. ***Note:*** Call processing for the entire system will be interrupted while the NTDK95 chassis expander cable is being replaced.
Defective PE circuit card	Replace the affected circuit cards. Enable the circuit card by entering **LD 32** **ENLS 1** Test the circuit card by entering **LD 30** **TEST**

Table 55
NTDK97 (Option 11C Mini) causes and actions (Continued)

Possible cause	Action
Keyword is invalid	To input proper keyword, use **LD 97** **REQ** **TYPE** **ISM** **KEY 1** **KEY 1** **KEY 1** Enable the circuit cards by entering **LD 32** **ENLC c** **("c" represents the card number)** Test the circuit cards by entering **LD 30** **TEST** (the TEST command ensures that all circuit cards are re-enabled in the chassis expander)
Defective NTDK97 MSC circuit card	Replace the NTDK97 MSC circuit card. ***Note:*** Call processing for the entire system will be interrupted while the NTDK97 MSC circuit card is being replaced. Test the circuit cards by entering **LD 30** **TEST**

Chapter 14 — Clearing trunk faults

Content list

The following are the topics in this section:

- Reference list 145
- Trunk faults 146
- Fault clearing procedures 146
- ISDN and DTI faults 147
- Trunk cannot make or receive calls (OVD message received) 148
- Trunk cannot make or receive calls (no OVD message) 151

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)
- “Final maintenance procedure” on page 225

Trunk faults

Trunk circuit cards provide the interface between the system and Central Office (CO) trunks, or between PBXs. The maintenance telephone can be used to test trunks. This chapter considers two types of trunk cards:

E&M Trunk: provides four trunk units, each of which can be connected to a trunk configured to operate as one of the following:

- E&M signaling trunk
- Two-wire Tie trunk
- Four-wire Tie trunk
- Paging trunk

Universal Trunk: provides eight trunk units, each of which can be connected to a trunk configured to operate as one of the following:

- Central Office trunk
- Direct Inward Dialing (DID) trunk
- Two-way Tie, Dial Repeating (2DR)
- Two-way Tie, Outgoing Automatic Incoming Dial (OAID) trunk
- Recorded Announcement (RAN) trunk
- Music trunk
- Paging trunk

Trunk faults can cause problems (such as noise) on outside calls and can keep calls from entering or leaving the Option 11C system.

Fault clearing procedures

Manual Continuity Tests can be used to isolate Network and Peripheral Equipment faults. See “LD 30” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Table 56 lists common trunk fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power or Common Equipment faults before you try to clear trunk faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards are in the chapter titled *Replacing equipment*. Additional information can be found in the *Installation guide*.

After the fault is corrected, go to *“ “Final maintenance procedure” on page 225”* to completely restore normal operation.

Table 56
Trunk fault indicators

Indicator	Possible indications
System messages	ERR090, 220, 270 OVD001—010 TRK messages
Visual indicators	Red LED lit on trunk circuit card
User reports	Users have trouble with a specific trunk Callers report continuous ringing Trouble with calls on console and/or telephones

CAUTION
Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

1.5 Mb ISDN or DTI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

2.0 Mb ISDN or DTI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Symptom:

Trunk cannot make or receive calls (OVD message received)

You cannot make or receive calls over a trunk and an overload (OVD) system message is received. The message indicates only this trunk has been disabled. Look up all system messages in *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate faults to Intelligent Peripheral Equipment, such as E&M and Universal Trunk circuit cards. See “LD 30” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- E&M Trunk circuit card: NT8D15
- Universal Trunk circuit card: NT8D14
- Any other trunk circuit card
- NTAK03 TDS/DTR circuit card
- NTDK20 SSC (Small System Controller) card
- NTDK97 MSC (Mini System Controller) card
- Trunk equipment (such as music source or paging equipment)

Table 57
Trunk cannot make or receive calls (OVD message received)

Possible cause	Action
Defective trunk circuit card	If the indicated circuit card is an E&M or Universal Trunk circuit card, hardware disable then re-enable the circuit card to initiate a self-test. If the test fails, replace the circuit card. If the test passes, follow the procedure below. Disconnect the wiring between the circuit card and the cross-connect terminal. Enable the TN by entering **LD 32** **ENLU c u** **("c u" represents card and unit numbers)** Wait for an OVD message. If you receive an OVD message, replace the circuit card. If you do not receive an OVD message, reconnect the wiring and go to the next possible cause.
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment (such as a music source or paging equipment). Enable the TN and wait for an OVD message. If you receive an OVD message, repair or replace the wiring to the PE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone. If the trunk circuit card still will not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.

Table 57
Trunk cannot make or receive calls (OVD message received)

Possible cause	Action
	Enable the TN by entering **LD 32** **ENLU c u** **("c u" represents card and unit numbers)** Wait for an OVD message. If you receive an OVD message, replace the circuit card. If you do not receive an OVD message, reconnect the wiring and go to the next possible cause.
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Defective SSC, MSC or TDS/DTR circuit card	Use the attendant console to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter **LD 36** **TRK c u** **("c u" represents card and unit numbers)** ***Note:*** See the *X11 Maintenance* (553-3001-511) for information on using this test. If you do not hear outpulsing, the Digitone Receiver, Tone and Digit Switch, or Multi-Frequency Sender may not be sending or receiving digits and the fault will affect more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.

Symptom:

Trunk cannot make or receive calls (no OVD message)

You cannot make or receive calls over a trunk, but there is no overload (OVD) or other system message showing the TN for this trunk is defective or has been disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity can be used to isolate faults to Intelligent Peripheral Equipment, such as E&M and Universal Trunk circuit cards. See “LD 30” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Trunk connections from the main frame to the Peripheral Equipment can be checked with a butt-set or test set. Check the trunk wiring at the entry point for dial tone and progress toward the PE.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- E&M Trunk circuit card: NT8D15
- Universal Trunk circuit card: NT8D14
- Any other trunk circuit card
- NTAK03 TDS/DTR circuit card
- NTDK20 SSC (Small System Controller) card
- NTDK97 MSC (Mini System Controller) card
- Trunk equipment (such as music source or paging equipment)

Table 58
Trunk cannot make or receive calls (no OVD message)

Possible cause	Action
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Disabled or defective TN	Test the TN by entering **LD 30** **UNTT c u** **("c u" represents card and unit numbers)** Test other TNs by entering **TEST** If the test fails, replace the indicated item and test again.
Defective trunk circuit card	If the circuit card is an E&M or Universal Trunk circuit card, hardware disable then re-enable the circuit card to initiate a self-test. If the test fails, replace the circuit card. If the test passes, go to the next possible cause.
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment. Enable the TN and wait for an OVD message. If you receive an OVD message, repair or replace the wiring to the PE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone. If the trunk circuit card still will not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.

Table 58
Trunk cannot make or receive calls (no OVD message) (Continued)

Possible cause	Action
Defective SSC, MSC or TDS/DTR circuit card	Use the attendant console Barge-in to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter **LD 36** **TRK c u** **("c u" represents card and unit numbers)** ***Note:*** See the *X11 Maintenance* (553-3001-511) for information on using this test. If you do not hear outpulsing, the Digitone Receiver, Tone and Digit Switch, or Multi-Frequency Sender may not be sending or receiving digits and the fault will affect more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.
Excessive traffic in the system	Additional trunk circuit cards may be required to handle the traffic in the system.

Chapter 15 — Clearing attendant console faults

Content list

The following are the topics in this section:

- Reference list 155
- Attendant console faults 156
- Fault clearing procedures 156
- ISDN and DTI faults 158
- Console cannot make or receive calls (OVD message received) 158
- Console cannot make or receive calls (no OVD message) 160
- Indicator or digit display not functioning properly 162
- Operator cannot hear or be heard properly 163

Reference list

The following are the references in this section:

- *X11 Administration* (553-3001-311)
- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)

- *Option 11C Mini Planning and Installation* (553-3021-209)
- *Option 11C Planning and Installation* (553-3021-210)
- "How to clear faults" on page 63
- "Replacing equipment" on page 187
- "Final maintenance procedure" on page 225

Attendant console faults

Components that can cause an attendant console fault are:

- the console itself or add-on units
- the console power supply
- the building wiring
- the cross-connect from the console to the line circuit
- the unit on the peripheral line circuit card
- the peripheral line circuit card
- the ringing generator
- the cabinet power supply

If more than one attendant console is affected, look for connections such as:

- they are on the same line circuit card
- there is a problem with ringing or tones

Use the following software programs to isolate attendant console faults:

- LD 31 to test sets and consoles
- LD 30 to perform signaling and continuity tests

Fault clearing procedures

Table 59 lists common attendant console fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications then go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power or Common Equipment faults before you try to clear attendant console faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 63 to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards are in “Replacing equipment” on page 187. Additional information can be found in the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209).

After the fault is corrected, go to “Final maintenance procedure” on page 225 to completely restore normal operation.

Table 59
Common attendant console fault indicators

Indicator	Possible indications
System messages	
Visual indicators	Red LED lit on associated circuit cards
User reports	Trouble with calls Trouble with equipment (such as handset, headset, or display)

CAUTION
Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

1.5 Mb ISDN or DTI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

2.0 Mb ISDN or DTI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Symptom:

Console cannot make or receive calls (OVD message received)

The attendant console cannot make or receive calls. There is an OVD message indicating a TN for the attendant console has been disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Attendant console
- Peripheral Equipment (PE) circuit card associated with the console
- Common/Peripheral Equipment, Peripheral Equipment

Table 60
Console cannot make or receive calls (OVD message received)

Possible cause	Action
PE card circuitry latched	Disable card, reseat card and enable the card If the fault persists, go to the next possible cause.
Defective PE circuit card	Software disable the TN indicated by the OVD message by entering **LD 32** **DISU c u** **("c u" represents card unit number)** Disconnect the wiring between the PE circuit card and the cross-connect terminal. Re-enable the TN by entering **ENLU c u** **("c u" represents card unit number)** Wait for an OVD message If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.
Defective console	Disable the TN. Disconnect the wiring from the console to the jack. Re-enable the TN and wait for an OVD message. If you do not receive an OVD message, replace the console. If you receive an OVD message, reconnect the wiring and go to the next possible cause.

Table 60
Console cannot make or receive calls (OVD message received)

Possible cause	Action
Defective wiring	Disable the TN. Disconnect the wiring between the console and the cross-connect terminal. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. Re-enable the TN and wait for an OVD message. If you do not receive an OVD message, replace or repair the wiring between the console and the cross-connect terminal. If you receive an OVD message, replace or repair the wiring between the PE shelf and the cross-connect terminal.

Symptom:

Console cannot make or receive calls (no OVD message)

The attendant console cannot make or receive calls. There is no OVD message. There may be other system messages indicating the TN for this console is defective or has been disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up messages as you perform this procedure.

Table 61
Console cannot make or receive calls (no OVD message)

Possible cause	Action
No power to console	Check the power supply and wiring to see that the console is powered up. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. If there is a power supply problem, correct it. If there is no power problem, go to the next possible cause.
Defective console	Test the console by entering **LD 31** (See the *X11 Maintenance* (553-3001-511) for information on testing consoles with LD 31.) If the console fails the test, replace it. If the console passes the test, go to the next possible cause.
Console connected to wrong TNs	Check the cross-connect terminal to make sure the console is connected to the correct TNs. If the console is not connected correctly, fix the wiring. If the console is connected correctly, go to the next possible cause.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded Check the wiring between the console and the cross-connect terminal Check the wiring between the Peripheral Equipment shelf and the cross-connect terminal If there is a wiring problem, correct it.

Symptom:

Indicator or digit display not functioning properly

The attendant console operates, but some LCD indicators or digit displays are not functioning properly. Look up all system messages in the *X11 Maintenance* (553-3001-511) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

Table 62
Indicator or digit display not functioning properly

Possible cause	Action
Disconnected or defective power supply	Make sure the required power supplies to the attendant console are connected and are not defective. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. If there is still a console problem, go to the next possible cause.
Disabled TN	Software disable then re-enable each TN by entering **LD 32** **DISU c u** **ENLU c u** **("c u" represents card and unit number)** Test other TNs by entering **LD 30** **UNTT c u** Test other TNs by entering **TEST** If there is still a console problem, go to the next possible cause.

Table 62
Indicator or digit display not functioning properly (Continued)

Possible cause	Action
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the *X11 Administration* (553-3001-311)). If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering **LD 31** (See the *X11 Maintenance* (553-3001-511) for information on testing consoles with LD 31.) If the console fails the test, replace it.

Symptom:

Operator cannot hear or be heard properly

The attendant console operates, but the user cannot hear or be heard properly. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

Table 63
Operator cannot hear or be heard properly

Possible cause	Action
Defective headset or handset	Make sure the handset or headset is plugged into the correct jack on the console. Try another handset or headset. If the test equipment works, replace the equipment. If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering **LD 31** (See the *X11 Maintenance* (553-3001-511) for information on testing consoles with LD 31.) If the console fails the test, replace it. If the console passes the test, go to the next possible cause.
Defective Peripheral Equipment circuit card	Software disable each TN by entering **LD 32** **DISU c u** **("c u" represents card and unit number)** Disconnect the wiring between the PE circuit card and the cross-connect terminal. Re-enable and test each TN by entering **ENLU c u** Wait for an OVD message. If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.
Defective wiring to console	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded • check the wiring between the console and the cross-connect terminal • check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it.

Chapter 16 — Clearing telephone faults

Content list

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- Defective feature 179
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- No ring on 500- and 2500-type telephones 183
- Ringing frequency sounds incorrect. 185
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Reference list

The following are the references in this section:

- *X11 Administration* (553-3001-311)
- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C 1.5Mb DTI/PRI* (553-3011-310)
- *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311)
- *Option 11C 2.0Mb DTI/PRI* (553-3011-315)
- *Option 11C Mini Planning and Installation* (553-3021-209)
- *Option 11C Planning and Installation* (553-3021-210)
- "How to clear faults" on page 63
- See "Fault clearing procedures" on page 79.
- "Replacing equipment" on page 187
- "Final maintenance procedure" on page 225

Telephone faults

Components that can cause a telephone fault are:

- the telephone itself or add-on units
- the telephone power supply
- the building wiring
- the cross-connect from the telephone to the line circuit
- the unit on the peripheral line circuit card
- the peripheral line circuit card
- the ringing generator
- the cabinet or chassis power supply

If more than one telephone is affected, look for connections such as:

- they are on the same line circuit card
- there is a problem with ringing or tones

Use the following software programs and tests to isolate telephone faults:

- LD 30 to perform signaling tests
- LD 31 to test sets and consoles

Fault clearing procedures

Table 64 lists common telephone fault indications. To clear faults, select the symptom listed in this chapter that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Clear any power or Common Equipment faults before you try to clear telephone faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 63 to see if another type of fault is indicated.

Equipment replacement instructions for circuit cards are in “Replacing equipment” on page 187. Additional information can be found in the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209).

After the fault is corrected, go to “Final maintenance procedure” on page 225 to completely restore normal operation.

Table 64
Telephone fault indicators

Indicator	Possible indications
System messages	• ERR500 • MWL500 • NWS501 • OVD001—010 • XMI messages
Visual indicators	• Red LED lit on associated circuit cards
User reports	• Trouble with calls • Trouble with equipment (such as handset or add-on module)

CAUTION
Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

ISDN and DTI faults

Fault locating and clearing procedures for ISDN BRI related faults are contained in *Option 11C ISDN BRI Hardware Installation and Maintenance* (553-3011-311).

1.5 Mb ISDN or DTI related faults are contained in *Option 11C 1.5Mb DTI/PRI* (553-3011-310).

2.0 Mb ISDN or DTI related faults are contained in *Option 11C 2.0Mb DTI/PRI* (553-3011-315).

Symptom

Telephone cannot make or receive calls (OVD message received)

The telephone cannot make or receive calls. There is an OVD message indicating the TN for only this telephone has been disabled. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

- Peripheral Equipment (PE) circuit card
- Telephone
- Wiring between the cross-connect terminal and the telephone
- Wiring between the Peripheral Equipment shelf and the telephone

Table 65
Telephone cannot make or receive calls (OVD message received)

Possible cause	Action
Defective PE circuit card	Software disable the TN indicated by the OVD message by entering **LD 32** **DISU c u** **("c u" represent card and unit number)** Disconnect the wiring between the PE circuit card and the cross-connect terminal.
	Re-enable the TN by entering **ENLU c u** Wait for an OVD message. If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.

Table 65 (Continued)
Telephone cannot make or receive calls (OVD message received)

Possible cause	Action
Defective telephone	If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone. If there is an appropriate response, continue this procedure. Disable the telephone TN. Disconnect the wiring from the telephone to the jack. Re-enable the TN and wait for an OVD message. If you do not receive an OVD message, replace the telephone. If you receive an OVD message, reconnect the wiring and go to the next possible cause.
Defective wiring	Disable the TN. Disconnect the wiring between the telephone and the cross-connect terminal. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209)for wiring connections. Re-enable the TN and wait for an OVD message. If you do not receive an OVD message, replace or repair the wiring between the telephone and the cross-connect terminal. If you do not receive an OVD message, replace or repair the wiring between the telephone and the cross-connect terminal. If there is still a telephone problem, reconnect all wiring and go to the next possible cause.
Defective backplane	Disable the TN. Unseat the affected PE circuit card. Re-enable the TN and wait for an OVD message. If you receive an OVD message, replace the cabinet.

Symptom:

Telephone cannot make or receive calls (no OVD message)

The telephone cannot make or receive calls. There is no OVD message or other system message indicating the TN for this telephone is defective or disabled. There may or may not be dial tone when the handset is unhooked. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

Table 66
Telephone cannot make or receive calls (no OVD message)

Possible cause	Action
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Failed NTAK92 protector	If the telephone is an off-premises 2500 type, and is protected by the NTAK92, refer to “Replacing equipment” on page 187 for the replacement procedure for that protector.
Telephone connected to wrong TNs	Check the cross-connect terminal to make sure the telephone is connected to the correct TN. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. If the telephone is not connected correctly, fix the wiring. If the telephone is connected correctly, go to the next possible cause.

Table 66
Telephone cannot make or receive calls (no OVD message) (Continued)

Possible cause	Action
Disabled TN	Software disable then re-enable the telephone TN by entering **LD 32** **DISU c u** **ENLU c u** **("c u" represents card and unit number)** Test other TNs by entering **LD 30** **UNTT c u** Test other TNs by entering **TEST** If there is still a telephone problem, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. ***Note:*** If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. • Check the wiring between the telephone and the cross-connect terminal • check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it.

Symptom:

One end cannot hear or cannot be heard

The person at the far end can hear you but you cannot hear them or the person at the far end cannot hear you but you can hear them. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Peripheral Equipment (PE) circuit card
- Telephone handset
- Telephone
- Wiring to the telephone

Table 67
One end cannot hear or cannot be heard

Possible cause	Action
Fault on other equipment	Check with the user to determine if the fault is present only on • certain types of calls (such as on a paging trunk or a Tie trunk) • calls to a specific location • calls to a specific telephone or other piece of equipment (such as a modem or Fax machine) If the fault occurs only with certain calls, take the appropriate action. If the fault occurs on all calls, go to the next possible cause.
Defective handset	Check the receiver or transmitter in the handset. If one is defective, replace the handset or, if necessary, the telephone.

Table 67
One end cannot hear or cannot be heard (Continued)

Possible cause	Action
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. ***Note:*** If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone.
Defective PE circuit card	Software disable the telephone TN by entering **LD 32** **DISU c u** **("c u" represents card and unit number)** Disconnect the wiring between the PE circuit card and the cross-connect terminal. Re-enable and test the TN by entering **ENLU c u** Wait for an OVD message. If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.

Table 67
One end cannot hear or cannot be heard (Continued)

Possible cause	Action
Defective wiring to telephone	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. • Check the wiring between the telephone and the cross-connect terminal • check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it.

Symptom:

Noise or low volume on all calls

There is noise on the line on all calls or the volume is lower than usual on all calls. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Peripheral Equipment (PE) circuit card
- Telephone
- Wiring to the telephone

Table 68
Noise or low volume on all calls

Possible cause	Action
Defective handset	Replace handset If problem is not cleared, go to the next possible cause.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded. Refer to the *Option 11C Planning and Installation* (553-3021-210) or the *Option 11C Mini Planning and Installation* (553-3021-209) for wiring connections. • Check the wiring between the telephone and the cross-connect terminal • check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it. If there is no problem with the wiring, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone.

Table 68
Noise or low volume on all calls (Continued)

Possible cause	Action
Defective PE circuit card	Software disable the telephone TN by entering **LD 32** **DISU c u** **("c u" represents card and unit number)** Disconnect the wiring between the PE circuit card and the cross-connect terminal. Re-enable and test the TN by entering **ENLU c u** Wait for an OVD message. If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.

Symptom:

Defective indicator, digit display, or component

The telephone can place and receive calls, but one or more LED or LCD indicator, a digit display, or a component (such as a handsfree unit) is not working. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Power supply to telephone
- Peripheral Equipment (PE) circuit card
- Telephone

Table 69
Defective indicator, digit display, or component

Possible cause	Action
Telephone has incorrect software parameters	Disconnect then reconnect power to the telephone to force a reset and parameter download. If the fault is not cleared, go to the next possible cause.
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone.
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the *X11 Maintenance* (553-3001-511)). If there is still a telephone problem, go to the next possible cause.

Symptom:

Defective feature

The telephone can make and receive calls, but one or more of its features (such as call transfer or ring again) is not working. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

Table 70
Defective feature

Possible cause	Action
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the *X11 Administration* (553-3001-311)). If there is still a console problem, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. If the telephone is a Meridian Digital Telephone, enter **LD 32** **IDU c u** If there is no response, replace the telephone.

Symptom:

Defective add-on module

The telephone can make and receive calls, but an add-on module connected to it is not working. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Add-on module
- Data option circuit card
- Power supply for add-on module

Table 71
Defective add-on module

Possible cause	Action
Defective power supply for add-on module	If the add-on module requires a separate power supply, make sure it is properly connected. If there is still a telephone problem, go to the next possible cause.
Defective add-on module	Replace the add-on module.
Defective data option circuit card	If the fault is with a data add-on module, replace the data option circuit card.

Symptom:

Cannot dial from 2500-type telephone

A user cannot dial from a 2500-type telephone. The condition may exist on more than one telephone and may be intermittent. The telephone may occasionally experience a “no dial tone” condition. Calls from other types of sets are not affected. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- NTDK20 SSC card (Option 11C)
- NTDK97 MSC card (Option 11C Mini)
- NTAK03 TDS/DTR circuit card
- Telephone
- Wiring to the telephone

Table 72
Cannot dial from 2500-type telephone

Possible cause	Action
Incorrectly programmed	To determine the correct Class Of Service (CLS) use **LD 20** **PRT** **I**f CLS is DIP, change to DTN using **LD 10**
Defective telephone	If only one telephone is affected, replace it. If there is still a telephone problem, go to the next possible cause.

Table 72
Cannot dial from 2500-type telephone (Continued)

Possible cause	Action
Defective PE circuit card	Replace the affected circuit cards. Enable the circuit card by entering **LD 32** **ENLS s** (**s** represents the shelf number; **0** for the main cabinet, **1** for the first expansion cabinet, **2** for the second, **3** for the third and **4** for the fourth expansion cabinet.) Test the circuit card by entering **LD 30** **TEST**
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded • check the wiring between the telephone and the cross-connect terminal • check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it. If there is still a telephone problem, go to the next possible cause.
Defective Digitone Receiver	If the condition is intermittent or more than one telephone is affected, test the Digitone Receivers in the NTDK20 SSC card (Option 11C) or NTDK97 MSC card (Option 11C Mini) by entering **LD 34** **DIS 0** and **ENL 0** Replace any units that fail the test. Test Digitone Receivers in the NTAK03 TDS/DTR by entering **LD 34** **DTR c u** **(“c u” represents card and unit number of the DTR).** If there is still a telephone problem, go to the next possible cause.

Table 72
Cannot dial from 2500-type telephone (Continued)

Possible cause	Action
Excessive Digitone traffic	Additional Digitone Receivers may be required to handle the traffic in the system. Refer to the *Technical Reference guide.*

Symptom:

No ring on 500- and 2500-type telephones

Both 500- and 2500-type telephones do not ring. One or several sets in the same cabinet are experiencing the problem. Look up all system messages in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Constantly observe and look up system messages as you perform this procedure.

You may need to replace:

- Ringing Generator: NTAK04, NTAK05, NTDK72, NTDK78 power supply
- Option 11C Mini Main Chassis or Chassis Expander (Verify the DIP switch settings prior to replacement.) See “Fault clearing procedures” on page 79.
- Peripheral Equipment (PE) circuit card
- Telephone
- Wiring to the telephone

Table 73
No ring on 500- and 2500-type telephones

Possible cause	Action
Defective telephone	If only one telephone is affected, replace it. If there is still a telephone problem, go to the next possible cause.
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded check the wiring between the telephone and the cross-connect terminal check the wiring between the PE shelf and the cross-connect terminal If there is a wiring problem, correct it. If there is still a telephone problem, go to the next possible cause.
Defective PE circuit card	Software disable the telephone TN by entering **LD 32** **DISU c u** **("c u" represents card and unit number)** Disconnect wiring between the PE circuit card and the cross-connect terminal. Re-enable and test the TN by entering **ENLU c u** Wait for an OVD message. If you receive a message indicating a problem with the circuit card or unit, replace the circuit card. If you do not receive a message indicating a problem with the circuit card or unit, reconnect the wiring and go to the next possible cause.
Defective Ringing Generator for the Option 11C	If several sets on different circuit cards in the same cabinet are affected, replace the NTAK04, NTAK05, NTDK72, or NTDK78 power supply, whichever is equipped in the cabinet.

Table 73
No ring on 500- and 2500-type telephones (Continued)

Possible cause	Action
Wrong Ring Generator setting for the Option 11C Mini	Be sure that the DIP switch selecting the ring frequency is set correctly. This switch is located on the front top plate inside the chassis.
Defective Ringing Generator for the Option 11C Mini	If several sets on different circuit cards in the same chassis are affected, replace the chassis.
Wrong vintage of NTDK16 line card in 11C Mini.	Check vintage of 48 port digital line card. If main chassis is NTDK91AA or NTDK91AB then the system must have NTDK16AA digital line card installed.

Symptom:

Ringing frequency sounds incorrect.

Table 74
Ringing frequency sounds incorrect.

Possible cause	Action
Wrong ringing frequency dip switch setting on Option 11C Mini.	Be sure that the dip switch selecting the ringing frequency is set correctly. This switch is located on the front top plate inside the chassis. Refer to Power supply DIP switch settings in *Option 11C Mini Planning and Installation* (553-3021-209).

Symptom:

Message waiting lamp on 500 and 2500 type telephones does not light.

Possible cause	Action
Incorrect dip switch setting on Option 11C Mini.	Be sure that the dip switch selecting the ringing frequency is set correctly. This switch is located on the front top plate inside the chassis. Refer to Power supply DIP switch settings in *Option 11C Mini Planning and Installation* (553-3021-209). Be sure selecting message waiting lamp is set correctly.

Chapter 17 — Replacing equipment

Content list

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Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Option 11C Mini Planning and Installation* (553-3021-209)
- *Option 11C Planning and Installation* (553-3021-210)
- *Option 11C and 11C Mini Upgrade Procedures* (553-3021-250)

Removing cabinet covers

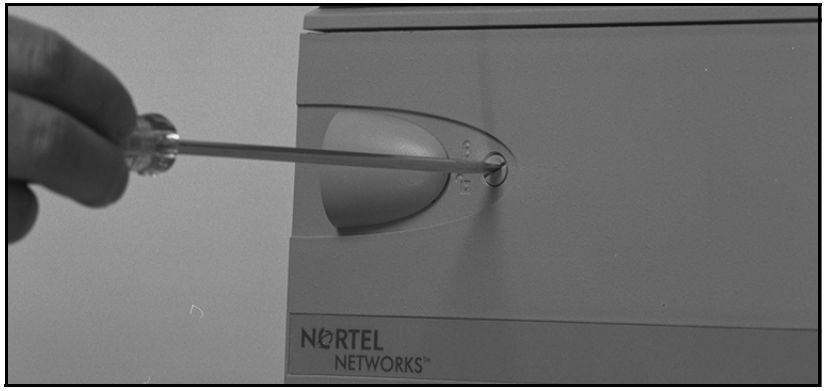
If the front cover lock latches are in their locked position, use a screwdriver and turn the lug on each latch 90° to the unlocked position (Refer to Figure 4 on page 189).

Simultaneously slide both latches in towards the center of the cabinet.

Grasp the sides of the cover and pull the top outwards, then lift it upward to remove it from the cabinet.

Note: The bottom of the front cover is supported but not secured to the cabinet. Be careful not to drop it.

Figure 4
Locking latch on the cabinet cover



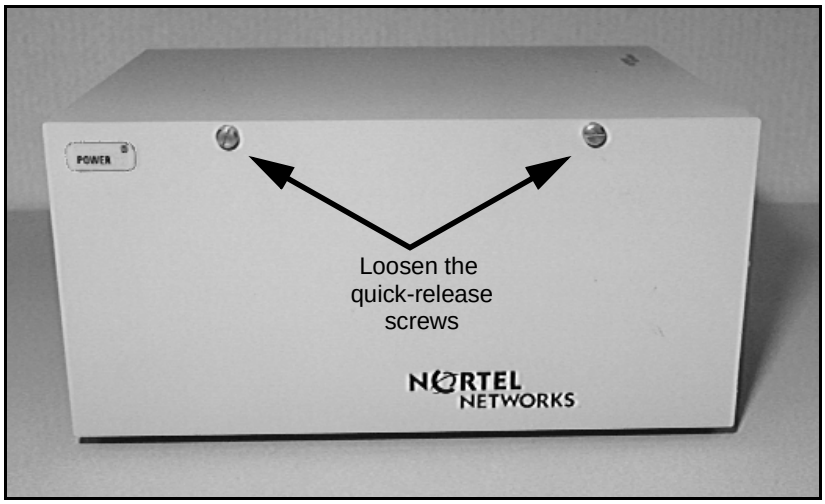
Removing the chassis cover

For the Option 11C Mini, to remove the faceplate of the chassis:

1. Loosen the quick-release screws on the faceplate of the chassis (Figure 5).
2. Lift the faceplate up.
3. Remove the faceplate.

End of Procedure

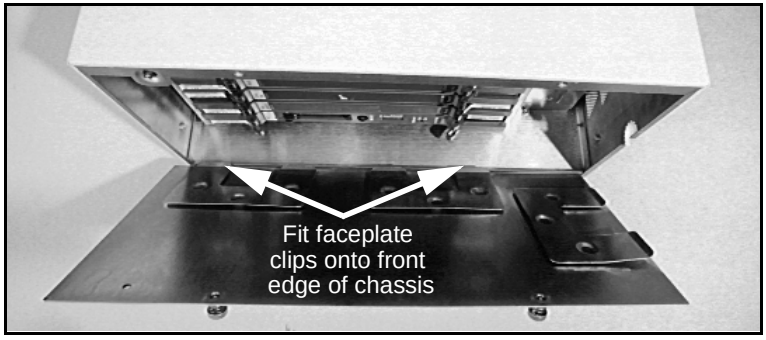
Figure 5
Faceplate on the Option 11C Mini chassis



Replacing the chassis faceplate.

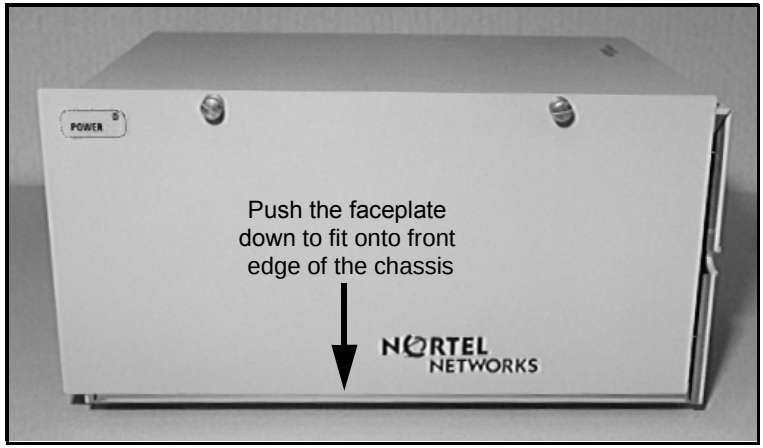
1 Fit the clips at the bottom of the faceplate into the raised edge at the bottom of the chassis, and slightly to the left (Figure 6).

Figure 6
Aligning the faceplate with the chassis



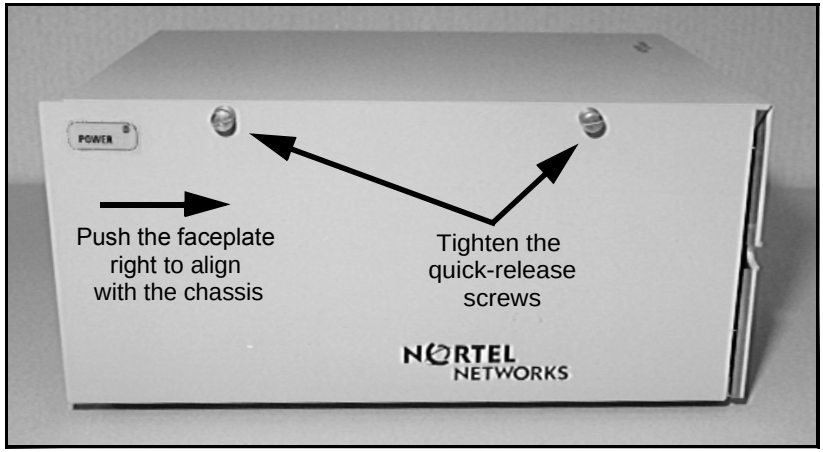
2 Move faceplate down so that the clips fit over the raised edge at the bottom of the chassis (Figure 7).

Figure 7
Fitting the faceplate on to the front of the chassis



3 Slide the faceplate to the right, and tighten the quick-release screws into the two holes at the top of the chassis (Figure 8).

Figure 8
Securing the faceplate



End of Procedure

Replacing the chassis

For the Option 11C Mini, to replace the chassis:

1 Prepare for the replacement by:

— Informing all users that the system will be taken out of service, and making provisions as required.

— Having all required tools available.

2 Turn off the power switch.

3 Disconnect all cables, making note of their existing connections.

4 Move the new chassis into position.

5 Reconnect all cables, as well as the strain relief strap for the power cable.

6 Remove the faceplate (as described on page 189).

7 Attach a grounding strap between your wrist and an unpainted surface on the chassis.

8 Transfer all cards from the old system to the new chassis.

9 Remove the grounding strap.

10 Replace the faceplate (as described on page 190).

11 Turn on the power switch.

———————— ***End of Procedure*** ————————

Replacing the NTAK04 or NTDK78 AC/DC power supply

The following procedure describes how to replace the NTAK04 or NTDK78 AC/DC power supply in your Option 11C system.

WARNING

Wait at least five minutes after power to the unit is switched off before removing the AC/DC power supply from the cabinet. Make sure that the power cord is disconnected.

1 Make sure that the breaker on the faceplate of the AC/DC power supply is in the OFF position.

2 Disconnect the AC power cord from the bottom left side of the power supply.

3 If the system is equipped with a battery backup system, set the breaker on the NTAK28 Junction Box to the OFF position and disconnect the DC power cord. This cord is located on the bottom right side of the power supply.

4 If the system is equipped with expansion cabinet(s), disconnect the NTBK62 (A0373953) Fiber Interface Power cable. This cable is located on the bottom right side of the power supply.

5 After five minutes, unlock the latches of the NTAK04 or NTDK78 AC/DC power supply circuit card and remove the power supply from the cabinet.

6 Make sure that the AC breaker on the front of the replacement AC/DC power supply is in the OFF position.

7 Make sure that the option switches on the AC/DC power supply are properly set.

8 Refer to Figure 9 below.

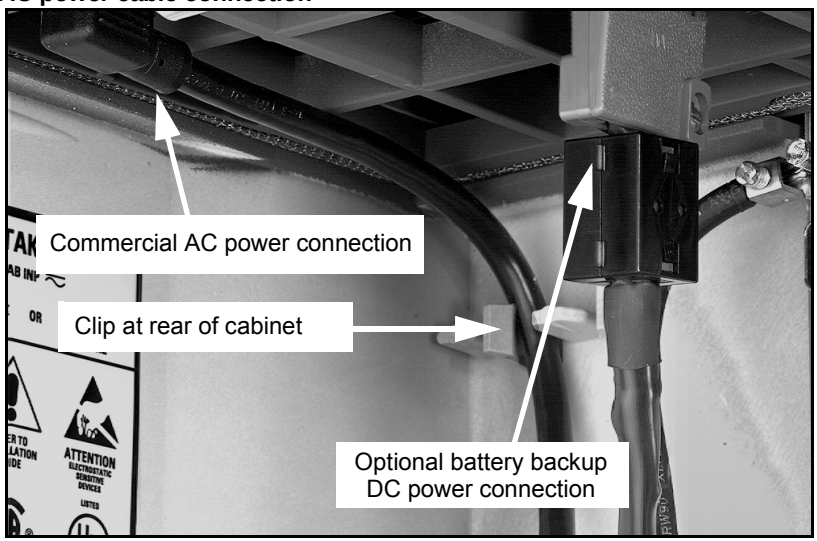
9 Insert the AC/DC power supply into the first slot labeled “PWR” on the left side of the card shelf of either the main or expansion cabinet.

10 Lock the AC/DC power supply into place with the card tabs.

11 Connect the power cord to the connector on the bottom left side of the AC/DC power supply.

Refer to Figure 9.

Figure 9
AC power cable connection



12 If the system is equipped with a battery backup system, connect the DC power cord to the connector on the bottom right side of the DC power supply.

13 If the system is equipped with expansion cabinet(s), connect the NTBK62 (A0373953) Fiber Interface Power cable to the connector on the bottom right side of the DC power supply.

14 Set the breaker on the AC/DC power supply to the ON position.

15 If the system also supports a battery back up system, set the breakers on the NTAK28 Junction Box and battery system to the ON position.

End of Procedure

Replacing the NTAK05 or NTDK72 DC power supply

The following procedure describes how to replace the NTAK05 or NTDK72 DC power supply in your Option 11C system.

WARNING

Wait at least five minutes after power to the unit is switched off before removing the DC power supply from the cabinet. Make sure that the power cord is disconnected.

1. Make sure that the breaker on the faceplate of the DC power supply is in the OFF position.
2. Disconnect the DC power cord or the NTBK62 (A0373953) Fiber Interface Power cable from the DC power supply. The cord is located on the bottom right side of the power supply.
3. After 5 minutes, unhook the lock latches on the DC power circuit card, and remove the power supply from the cabinet.
4. Place the power pack in an antistatic bag. If you are storing it, place it in the shipping container it was originally packaged in.
5. Slide the replacement DC power supply into its slot in the cabinet.

WARNING

Make sure the circuit breaker on the faceplate of the power supply is set to OFF before you continue.

6. Lock the DC power supply into place with the card tabs.
7. Connect the DC power cord or the Fiber Interface Power cable to the connector on the right side of the DC power supply.
8. Make sure that the other end of the DC power cable is connected to the NTAK28 Junction Box. If it is not, ensure that the breaker on the junction box is in the OFF position, and connect the DC power cable to the junction box.
9. Set the breakers on the NTAK28 Junction Box and on the DC power supply to the ON position.

End of Procedure

Replacing the NTAK02 SDI/DCH circuit card

The following procedure describes how to replace the NTAK02 SDI/DCH circuit card.

1 If the following ports are configured, disable them in their corresponding overlays:

SDI or EDSI	**LD 48**
DCHI	**LD 96**
DPNSS	**LD 75**

The system may initialize if you do not perform this step.

2 Hold the SDI/DCH circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet.

3 Verify the settings of the switches and jumper plugs on the replacement circuit card and correct any settings that need to be changed.

The settings should be the same as the existing circuit card. For information about settings refer to the *Option 11C Mini Planning and Installation* (553-3021-209) or the *Option 11C Planning and Installation* (553-3021-210).

4 Hold the SDI/DCH circuit card by the lock latches and slide it into it assigned slot until it connects with the backplane.

5 Secure the lock latches on the circuit card.

6 If the following ports have been previously disabled, enable them in their corresponding overlays:

SDI and ESDI	**LD 48**
DPNSS	**LD 75**
DCHI	**LD 96**

End of Procedure

Replacing the NTAK03 TDS/DTR circuit card

The following procedure describes how to replace the NTAK03 TDS/DTR circuit card.

1 Disable the SDI ports, and the DTR and TDS capabilities using the following overlays:

SDI ports **LD 48**

TDS and DTR **LD 34**

The system may initialize if you do not perform this step.

2 Hold the TDS/DTR circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet.

3 Hold the replacement TDS/DTR circuit card by the lock latches and slide it into its assigned slot until it connects with the backplane.

4 Secure the lock latches on the circuit card.

5 Enable the SDI ports, TDS channels, and Digitone Receivers in their corresponding overlays:

SDI **LD 48**

TDS and DTR **LD 34**

End of Procedure

Replacing the NTAK09 1.5 Mb DTI/PRI card (PRI applications)

The following procedure describes how to replace the NTAK09 when configured as a PRI.

1 If the NTAK93 DCHI daughter board is attached to the card, disable the associated D-channel using the following overlay and commands:

LD 96DIS DCH X

If the NTBK51 DDCH daughter board is attached to the card, disable the associated downloadable D-channel using the following overlay and commands:

LD 96DIS DCH X

LD 96DIS MSDL X

2 Disable the Clock Controller (if on PRI) as follows:

LD 60DIS CC 0

3 Disable the PRI pack using these commands:

LD 60DISL X

Note: The LEDs on the front of the NTAK09 change from green (enabled) to red (disabled.) In order for this to happen, the DIS MSDL command has to be used, as in step 1.

4 Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet. If required, remove any daughter boards which may be attached. See the section below.

5 On the replacement PRI circuit card, set any switches and install any daughter boards as required. Hold the card by the lock latches and slide it into its assigned slot until it connects with the backplane.

6 Enable the Clock Controller (if on the PRI) and the PRI in their corresponding overlays:

LD 60 ENL CC0

LD 60 EN LL X

The associated DCHI will automatically enable.

7 Check the tracking of the Clock Controller with the following overlay:

LD 60 SSCK 0

If it is not tracking or is not locked, use the following instruction to track:

LD 60 SSCK 0

LD 60 TRCK PCK/SCLK

End of Procedure

Removing the daughter boards

Use these guidelines to remove the NTAK20 and NTAK93 from the NTAK09 card. Because of the physical layout of the mother and daughter boards, the NTAK20 should be removed before the NTAK93.

1 Starting at the two corners opposite the connector, gently lift each corner out of the locking groove of the standoff.

2 At the two corners adjacent to the connector, gently lift the entire side until the mounting holes are clear of the locking groove of the standoff.

3 To remove the connector pins, grasp the edge of the board adjacent to the connector and lift gently.

End of Procedure

If more than one NTAK09 card is installed, the additional cards may not carry daughter boards, depending on the system configuration. At least one NTAK20 (per system) is always required.

Mounting the daughter boards

Install the NTAK93 daughter board before the NTAK20 daughter board. Work on a flat surface when mounting or removing daughter boards.

1 Visually inspect the connector pins on the underside of the daughter board. Any pins that are bent should be realigned prior to mounting.

2 Place the NTAK09 down flat on an antistatic pad.

3 From an overhead viewpoint, with the daughter board parallel above the NTAK09 and the connector pins aligned over the connector sockets, line up the mounting holes on the daughter board (see figure below) with the tops of the standoffs on the NTAK09.

4 Slowly lower the daughter board towards the NTAK09, keeping the standoffs in line with all four holes, until the holes are resting on the tops of the four standoffs.
If more than a very slight amount of pressure is required at this point, the connector pins may not be aligned with the connector socket. If so, lift the daughter board off the NTAK09 and return to step 2.

5 Gently apply pressure along the edge of the board where the connector is located until the STAND OFFS at the two corners adjacent to the connector snap into a locked position. Press down the two corners on the opposite side until they also are locked into place.

End of Procedure

Replacing the NTBK50 2.0 Mb PRI card

The following procedure describes how to replace the NTBK50 2.0 Mb PRI card.

1 If the NTAK93 DCHI daughter board is attached to the card, disable the associated D-channel using the following overlay and commands:

LD 96DIS DCH X

If the NTBK51 DDCH daughter board is attached to the card, disable the associated downloadable D-channel using the following overlay and commands:

LD 96DIS DCH X

LD 96DIS MSDL X

2 Disable the Clock Controller as follows:

LD 60DIS CC 0

3 Disable the PRI pack using these commands:

LD 60DISL X

Note: The LEDs on the front of the NTDK50 change from green (enabled) to red (disabled.) In order for this to happen, the DIS MSDL command has to be used, as in step 1.

4 Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet. If required, remove any daughter boards which may be attached. See the section below.

5 On the replacement PRI circuit card, set any switches and install any daughter boards as required. Hold the card by the lock latches and slide it into its assigned slot until it connects with the backplane.

6 Enable the Clock Controller and the PRI in their corresponding overlays:

LD 60ENL CC 0

LD 60ENLL X

The associated DCHI/DDCH will automatically enable.

7 Check the tracking of the Clock Controller with the following overlay:

LD 60SSCK 0

If it is not tracking or is not locked, use the following instruction to track:

LD 60TRCK PCK/SCLK

End of Procedure

Removing the daughter boards

Use these guidelines to remove the NTAK20 and NTAK93/NTBK51 from the NTBK50 card. Because of the physical layout of the mother and daughter boards, the NTAK20 should be removed before the NTAK93/NTBK51.

1 Starting at the two corners opposite the connector, gently lift each corner out of the locking groove of the standoff.

2 At the two corners adjacent to the connector, gently lift the entire side until the mounting holes are clear of the locking groove of the standoff.

3 To remove the connector pins, grasp the edge of the board adjacent to the connector and lift gently.

End of Procedure

If more than one NTBK50 card is installed, the additional cards may not carry daughter boards, depending on the system configuration. At least one NTAK20 (per system) is always required, however.

Mounting the daughter boards

Install the NTAK93/NTBK51 daughter board before the NTAK20 daughter board. Work on a flat surface when mounting or removing daughter boards.

1 Visually inspect the connector pins on the underside of the daughter board. Any pins that are bent should be realigned prior to mounting.

2 Place the NTBK50 down flat on an antistatic pad.

3 From an overhead viewpoint, with the daughter board parallel above the NTBK50 and the connector pins aligned over the connector sockets, line up the mounting holes on the daughter board (see figure below) with the tops of the standoffs on the NTBK50.

4 Lower the daughter board onto the NTBK50, keeping the standoffs in line with all four holes, until the holes are resting on the tops of the four standoffs.

5 If more than a very slight amount of pressure is required at this point, the connector pins may not be aligned with the connector socket. If so, lift the daughter board off the NTBK50 and return to step 2.

6 Apply pressure along the edge of the board where the connector is located until the STAND OFFS at the two corners adjacent to the connector snap into a locked position. Then press down on the two corners on the opposite side until they also are locked into place.

End of Procedure

Replacing the NTAK10, NTAK09, or NTRB21 circuit cards (DTI applications)

The following procedure describes how to replace the NTAK10, NTAK09 and NTRB21 when configured as a DTI.

1 Disable the Clock Controller as follows:

LD 60 DIS CC 0

2 Disable the DTI pack using these commands:

LD 60 DISL X

3 Hold the circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet. If required, remove any daughter boards that may be attached to the NTAK09.

4 On the replacement DTI circuit card, set any switches and install any daughter boards as required. Hold the replacement DTI circuit card by the lock latches and slide it into its assigned slot until it connects with the backplane.

5 Enable the Clock Controller (if on the DTI) and the DTI in their corresponding overlays:

LD 60 ENL CC 0

LD 60 ENLL X

6 Check the tracking of the Clock Controller with the following overlay:

LD 60 SSCK 0

If it is not tracking or is not locked, use the following instruction to start tracking.

LD 60 TRCK PCK/SCLK

End of Procedure

Replacing the NT8D02, NT8D03, NT8D09, NT8D14, NT8D15, NTDK16, or NT8D16 Peripheral Equipment cards

Use this procedure to replace the following peripheral equipment cards:

- NT8D02 Digital Line Card
- NT8D03 Analog Line Card
- NT8D09 Analog Message Waiting Line Card
- NT8D14 Universal Trunk Card
- NT8D15 E&M Trunk Card
- NT8D16 Digitone Receiver Card
- NTDK16 Digital Line Card

See the *X11 System Messages Guide* (553-3001-411) for a description of all maintenance commands and system messages.

1 Software disable the card:

LD 32

DISC c "**c**" is the card number

Note: For Option 11C Mini, you must disable cards 4, 5, and 6.

2 Unhook the locking devices on the card; pull it out of the card cage.

3 Set option switches or jumper plugs on the following replacement cards the same as on the card you removed:

NT8D14 Universal Trunk Card

NT8D15 E&M Trunk Card

4 Insert the replacement card into the vacated slot and hook the locking devices.

When cards are installed, the red LED on the faceplate flashes as a self-test runs. If the self-test completes successfully, the card is automatically enabled (if it is configured in software) and the LED goes out. If the self-test fails, the LED lights steadily and remains lit.

Note: The NTDK16AA has one LED. This LED shows the status of Card 4. The NTDK16BA has three LEDs. These LEDs show the status of Cards 4, 5, and 6.

5 Software enable the card:
ENLC c
When the process is complete, you will receive a system response.
End the session:
****

End of Procedure

Replacing the NT5K21 Peripheral Equipment card

Use the following procedure to replace the NT5K21 XMFC/MFE peripheral equipment card:

See the *X11 Maintenance* (553-3001-511) and *X11 System Messages Guide* (553-3001-411) for a description of all maintenance commands and system messages.

1 Software disable the card:

LD 54

DISC c "**c**" is the card number

2 Unhook the locking devices on the card; pull it out of the card cage.

3 Insert the replacement card into the vacated slot and hook the locking devices.

When cards are installed, the red LED on the faceplate flashes as a self-test runs. If the self-test completes successfully, the card is automatically enabled (if it is configured in software) and the LED goes out. If the self-test fails, the LED lights steadily and remains lit.

4 Software enable the card:

ENLC c

When the process is complete, you will receive a system response.

End the session:

****

End of Procedure

Replacing the NTAG26 Peripheral Equipment card

Use the following procedure to replace the NTAG26 XMFR peripheral equipment card:

See the *X11 Maintenance* (553-3001-511) and *X11 System Messages Guide* (553-3001-411) for a description of all maintenance commands and system messages.

1 Software disable the card:

LD 34

DISC c "**c**" is the card number

2 Unhook the locking devices on the card; pull it out of the card cage.

3 Insert the replacement card into the vacated slot and hook the locking devices.

When cards are installed, the red LED on the faceplate flashes as a self-test runs. If the self-test completes successfully, the card is automatically enabled (if it is configured in software) and the LED goes out. If the self-test fails, the LED lights steadily and remains lit.

4 Software enable the card:

ENLC c

When the process is complete, you will receive a system response.

End the session:

****

End of Procedure

Replacing NTBK22, NT6D70, and NT6D71 circuit cards

The following procedures describe how to remove and replace defective ISDN BRI related circuit cards.

Removing and replacing the NTBK22 MISP

The MISP can be removed and inserted without turning off the power. This allows the system to continue processing calls not associated with the defective MISP.

Note: A clock controller is required for ISDN PRI, DTI or BRI trunk applications. If the MISP being removed is providing the clock function, the clock must be reassigned to another location. Refer to the chapter ISDN BRI trunk implementation for more information.

To remove a MISP:

1 Log-in on the maintenance terminal or telephone and load overlay program 32 (**LD 32**). Check the status of the MISP by entering **STAT c**, where "**c**" is the card slot number of the MISP.

Note: Make sure the MISP is idle before proceeding with the next step to avoid interrupting active calls.

2 When the MISP is idle, type DISC c and press the Enter key to disable the MISP, where c is the card slot number of the MISP.

3 Remove the MISP.

Remove the clock controller if there is one.

Place it in an antistatic bag away from the work area.

4 Insert and secure the replacement MISP in its card slot.

Install the clock controller if one is required.

The MISP automatically starts a self-test.

Observe the Dis LED on the front of the MISP. It is lit during the test. If it flashes three times and stays lit, it has passed the test. If it does not flash three times and then stays lit, it has failed the test.

5 At the **>** prompt in **LD 32**, type **ENLC c** and press the Enter key to enable the MISP. If the Dis LED on the MISP extinguishes, the MISP is functioning correctly and is ready to process calls.

———————— ***End of Procedure*** ————————

Removing and replacing the NT6D70 SILC or NT6D71 UILC

The SILCs and UILCs can be removed from and inserted without turning off the power.

Note: In the case where an ISDN BRI trunk connected to the card is providing a reference clock source to the system clock controller, the reference source must be reassigned to another location. Refer to the chapter entitled ISDN BRI trunk implementation for more information about the clock controller source.

To remove an SILC or UILC:

1 Log-in on the maintenance terminal or telephone and load overlay program 32 (**LD 32**).

Note: Make sure the MISP is idle before proceeding with the next step to avoid interrupting active calls.

2 Type **DISI c** and press the Enter key to disable the SILC or UILC, where "**c**" is the MISP card slot number.

Note: The **DISI** command waits until all units on the card are idle before disabling it. You may also use the **DISC** command, however, all calls associated with the card will be disconnected.

3 Remove the card.

Place it in an antistatic bag away from the work area.

4 Insert and secure the replacement card in its card slot.

The card automatically starts a self-test.

Observe the red LED on the front of the card. It is lit during the test. If it flashes three times and stays lit, it has passed the test. Go to step 9. If it does not flash three times and then stays lit, it has failed the test.

5 At the **>** prompt in **LD 32** program, type **ENLC c** and press the Enter key to enable the card.

If the red LED on the card extinguishes, it is functioning correctly and is ready to process calls.

———————— ***End of Procedure*** ————————

Verifying operation

To verify the operation of an SILC or UILC card:

1. Place an outgoing voice, data or packet data call, as appropriate, on an ISDN BRI terminal or trunk connected to a previously faulty card or DSL to verify the outgoing transmission and signaling channels.
2. Place an outgoing voice or data call on an ISDN BRI terminal to the ISDN BRI terminal or trunk in step 1 to verify the incoming transmission and signaling channels.
3. Repeat these two steps for other previously faulty cards and DSLs.

———————— ***End of Procedure*** ————————

To verify the operation of an MISP:

1. Place an outgoing voice, data or packet data call, as appropriate, on an ISDN BRI terminal or trunk connected to a DSL associated with a previously faulty MISP to verify its ability to process the signaling information received on D-channels.
2. Disconnect the call after you determined that the connection was successful.

———————— ***End of Procedure*** ————————

Replacing the NTAK92 Off-premise protection module

A lightning strike may cause failure of the NTAK92. The first indication of such failure is a dead telephone. Use either of the following procedures to check for and replace failed protectors.

Loop-closure test method

1. Test for dial tone across cable pairs on J1 and J2, using standard loop closure test equipment (e.g. butt-in). If a protector has failed, go to step 2. If not, go to the appropriate chapter in this guide.
2. Remove the protection module cover plate.
3. Remove the faulty protector.
4. Install a new protector in the same position as the faulty protector.
5. Replace the cover plate.
6. Test the set for proper operation.

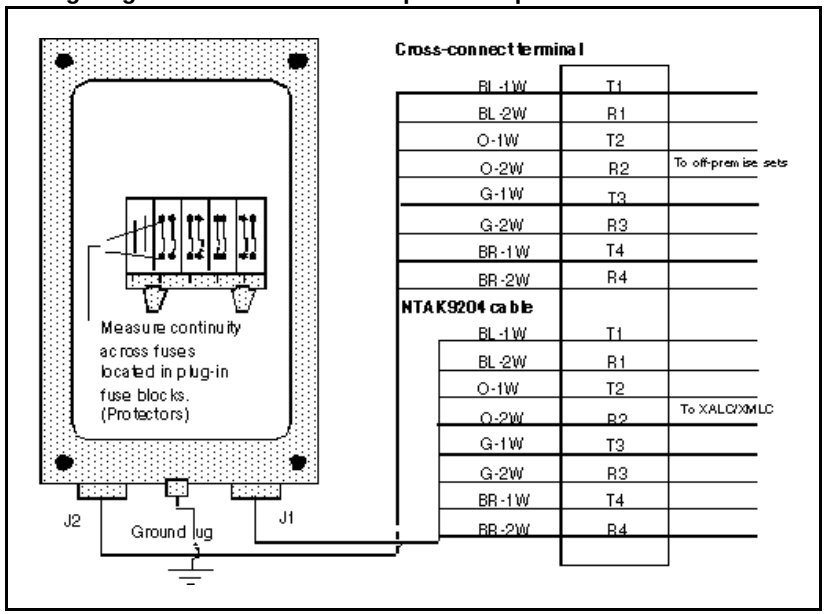
End of Procedure

Continuity method.

1. Remove the cover plate from the protection module.
2. Using an ohmmeter, measure continuity across the protectors (see diagram). If a protector has failed, go to step 3. If not, go to the appropriate chapter in this guide.
3. Remove the faulty protector.
4. Install a new protector in the same position as the faulty protector.
5. Replace the cover plate.
6. Test the set for proper operation.

End of Procedure

Figure 10
Wiring diagram for NTAK92AA Off-premises protection module



Replacing batteries in the NTAK75 battery box

Batteries should be checked periodically by measuring the battery voltage: both open circuit and float voltages. The batteries supplied with the NTAK75 have an average useful life of four years, meaning the batteries are depleted to 80% of capacity, and backup time is diminished. After this period of time the batteries should be replaced. For more information refer to step Step 14 on page 212, and also consult with the battery manufacturer.

The following procedure describes how to replace batteries in the NTAK75 battery box in your Option 11C system.

1 Remove the NTAK75 cover.

2 Set the breakers on the NTAK75 and on the NTAK04 or NTDK78 to OFF.

3 Locate and disconnect the four black/red jumper cables that connect the positive and negative battery terminals to the connectors J1-J4.

4 Remove the existing batteries.

5 Unpack the new batteries and check the dates on them. The same dates should appear on all batteries.

CAUTION

The battery cells can deliver high currents when short circuited. Make sure that you do not inadvertently short circuit the terminals of the batteries.

6 Place the individual batteries into the battery box (see Figure 11).

7 Reconnect the four black/red jumper cables disconnected in step 3. The four black and red jumper cables connect between the positive and negative terminals of one battery pack to the connectors marked “J1 - J4”. Any of the batteries may be attached to any connector J1 - J4 (see Figure 11).

8 Ensure the jumper wires are securely fastened by pulling out on the tabs of the connector.

9 Set the breaker on the NTAK75 to ON to test for correct battery wiring.

The NTAK75 green LED (BATT) should switch on. If it does not, the battery wiring should be checked.

10 Set the breaker on the NTAK75 to OFF.

11 Set the breaker on the NTAK04 or NTDK78 to ON. The BATT LED on the NTAK04 or NTDK78 remains off, indicating that the battery box breaker is off. The LED on the NTAK75 lights, indicating that the NTAK0410 cable and connections are correct.

12 Turn the breaker on the NTAK75 to ON. The BATT LED on the NTAK04 or NTDK78 will light.

The NTAK04 or NTDK78 AC/DC power supply cannot power up on battery alone. AC power must be available.

13 Install the cover on the NTAK75.

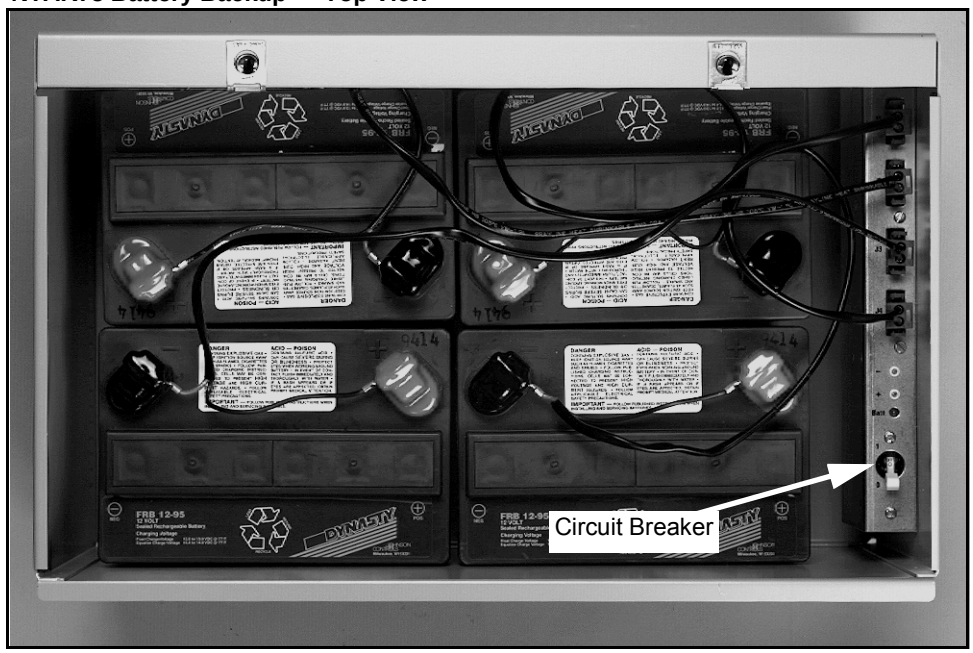
14 As an optional step the DC voltage can be measured. It is recommended that this measurement be made after the batteries have been charged for 24 hours, to obtain accurate readings.

DC voltage can be measured between test points whenever the green BATT LED is lit on the NTAK75. The test points are protected by high resistance: it is impossible to damage the battery unit by short-circuiting the test points to each other or to the metal case. Three different voltage readings can be made:

- Open circuit battery voltage when the NTAK04 or NTDK78 circuit breaker is off and the NTAK75 circuit breaker is on. This voltage should be less than -46Vdc.
- NTAK04 or NTDK78 DC output when the NTAK04 or NTDK78 circuit breaker is on and the NTAK75 circuit breaker is off. This voltage should be between -52.95Vdc and -54.5Vdc.
- NTAK04 or NTDK78 float charge voltage when the NTAK04 or NTDK78 breaker is on and the NTAK75 circuit breaker is on. This voltage should be between -52.95Vdc and -54.5Vdc.

End of Procedure

Figure 11
NTAK75 Battery Backup — Top View



Replacing batteries in the NTAK76 battery box

Batteries should be checked periodically by measuring the battery voltage: both open circuit and float voltages. The batteries supplied with the NTAK75 have an average useful life of four years, meaning the batteries are depleted to 80% of capacity, and backup time is diminished. After this period of time the batteries should be replaced For more information refer to Step 14 on page 216 and also consult with the battery manufacturer.

The following procedure describes how to replace batteries in the NTAK76 battery box in your Option 11C system.

1 Remove the NTAK76 cover.

2 Set the breakers on the NTAK76 and on the NTAK04 or NTDK78 to OFF.

3 Locate and disconnect the black, red and white jumper cables that connect the positive and negative battery terminals to connector J1.

4 Remove the existing batteries.

5 Unpack the new batteries and check the dates on them. The same dates should appear on all batteries.

CAUTION

The battery cells can deliver high currents when short circuited. Make sure that you do not inadvertently short circuit the terminals of the batteries.

6 Place the individual batteries into the battery box with the terminal end down. Hold the batteries in place with the restraining bar.

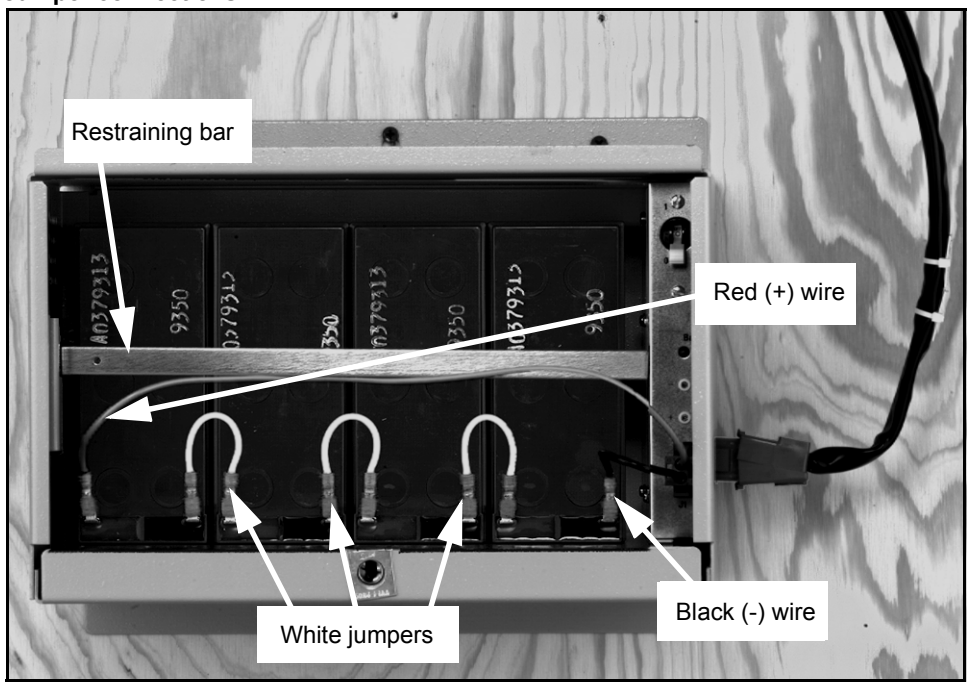
7 Reconnect the three white jumper wires and the red and black jumper cables disconnected in step 3. The battery packs are connected in series by the white jumper wires between the positive (red) terminal of one battery pack to the negative (black) terminal of the next battery pack.
(See Figure 12).

8 Connect the remaining red and black jumper cable to red and black terminals of the first and fourth battery pack. Connect the jumper cable to the NTAK76 breaker panel, marked J1. See Figure 12.

The red positive (+) wire connects to the red (+) post of Battery 1. The black negative (-) wire connects to the black post (-) of battery 4.

Ensure all connections are secured.

Figure 12
Jumper connections



9 Set the breaker on the NTAK76 to ON to test for correct battery wiring.

The NTAK76 green LED (BATT) should switch on. If it does not, the battery wiring should be checked.

10 Set the breaker on the NTAK76 to OFF.

11 Set the breaker on the NTAK04 or NTDK78 to ON. The BATT LED on the NTAK04 or NTDK78 remains off, indicating that the battery box breaker is off. The LED on the NTAK76 lights, indicating that the NTAK0410 cable and connections are correct.

12 Set the breaker on the NTAK76 to ON. The BATT LED on the NTAK04 or NTDK78 will light.

The NTAK04 or NTDK78 AC/DC power supply cannot power up on battery alone. AC power must be available.

13 Install the cover on the NTAK76.

14 As an optional step the DC voltage can be measured. It is recommended that this measurement be made after the batteries have been charged for 24 hours, to obtain accurate readings.

DC voltage can be measured between test points whenever the green BATT LED is lit on the NTAK76. The test points are protected by high resistance: it is impossible to damage the battery unit by short-circuiting the test points to each other or to the metal case. Three different voltage readings can be made:

- Open circuit battery voltage when the NTAK04 or NTDK78 circuit breaker is off and the NTAK76 circuit breaker is on. This voltage should be less than -46Vdc.
- NTAK04 or NTDK78 DC output when the NTAK04 or NTDK78 circuit breaker is on and the NTAK76 circuit breaker is off. This voltage should be between -52.95Vdc and -54.5Vdc.
- NTAK04 or NTDK78 float charge voltage when the NTAK04 or NTDK78 breaker is on and the NTAK76 circuit breaker is on. This voltage should be between -52.95Vdc and -54.5Vdc.

End of Procedure

Replacing the NTDK20 SSC card

If the system is presently equipped with an NTDK81 Software Daughterboard, the replacement NTDK20 SSC card must support REL 09 or higher version Boot Code. If the replacement SSC card is Rlse 11 or higher (as indicated on its faceplate), the Boot Code version is at least REL 09 and is capable of supporting an NTDK81 Software Daughterboard.

Earlier versions of NTDK20 SSC cards (Rlse 10 or lower) can be updated to Boot Code REL 09 (or higher) from a 23.30 or later PCMCIA card.

Ensure that the replacement NTDK20 SSC card is either Rlse 11 or later, or one that has had the Boot Code updated to REL 09 or higher.

Note: It is not possible to update the Boot Code as part of the replacement procedure.

The following procedure describes how to replace the NTDK20 SSC (Small System Controller) card.

1 Perform an **EDD** backup in **LD 43**.

2 Set the breaker on the cabinet power supply to the OFF position.

3 Hold the NTDK20 SSC circuit card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet.

4 Remove the Software Daughter Board.

Refer to “Replacing the NTTK13 Software Daughter Boards” on page 219.

5 If you have a NTDK26 Backwards Compatible Daughter Board, remove it.

Refer to “Replacing the NTDK26 Backwards Compatible Daughter Board” on page 224.

6 If you have an NTDK22, NTDK24, NTDK79, NTDK84 or NTDK85 Fiber Daughter Board, remove it.

Refer to “Replacing the NTDK22, NTDK24, NTDK79, NTDK84, or NTDK85 Fiber Daughter Board” on page 222.

7 If have another NTDK22, NTDK24, NTDK79, NTDK84 or NTDK85 Fiber Daughter Board, remove it.

Refer to “Replacing the NTDK22, NTDK24, NTDK79, NTDK84, or NTDK85 Fiber Daughter Board” on page 222.

8 Ensure that the Software Daughter Board is properly installed and seated on the replacement NTDK20 SSC circuit card.

Refer to “Replacing the NTTK13 Software Daughter Boards” on page 219.

9 If you have a NTDK26 Backwards Compatible Daughterboard, ensure that it is installed and properly seated on the replacement NTDK20 SSC circuit card.

Refer to “Replacing the NTDK26 Backwards Compatible Daughter Board” on page 224.

10 If you have an NTDK22, NTDK24, NTDK79, NTDK84 or NTDK85 Fiber Daughter Board, ensure that it is installed and properly seated on the replacement NTDK20 SSC circuit card.

Refer to "Replacing the NTDK22, NTDK24, NTDK79, NTDK84, or NTDK85 Fiber Daughter Board" on page 222.

11 If you have another NTDK22, NTDK24, NTDK79, NTDK84 or NTDK85 Fiber Daughter Board, ensure that it is installed and properly seated on the replacement NTDK20 SSC circuit card.

Refer to "Replacing the NTDK22, NTDK24, NTDK79, NTDK84, or NTDK85 Fiber Daughter Board" on page 222.

12 Hold the NTDK20 SSC circuit card by the lock latches and slide it into slot 0 in the main cabinet labeled "CPU" until it connects with the backplane.

13 Secure the lock latches on the circuit card.

14 Set the breaker on the cabinet power supply to the ON position.

End of Procedure

Replacing the NTDK97 MSC card

For the NTDK97 MSC, the Boot Code version is at least NTDK34FA REL 04.

The following procedure describes how to replace the NTDK97 MSC (Mini System Controller) card.

1 Perform a data dump in LD 43. Save the data to an external backup media either:

— perform a BKO command in LD 43 to save the data to a PCMCIA card

or

— perform an XBK command in LD 143 to save the data to a computer

2 Turn off the power switch.

3 Hold the NTDK97 MSC circuit card by the lock latches, unlock the latches, and slide the circuit card out of the chassis.

4 Remove the security device from the old NTDK97 and install on the new NTDK97.

5 Hold the NTDK97 MSC circuit card by the lock latches and slide it into slot 0 in the main chassis labeled “CPU” until it connects with the backplane.

6 Secure the lock latches on the circuit card.

7 Power up the system.

8 Re-install the software on the new NTDK97 using the procedure outlined in the *Option 11C Mini Planning and Installation* (553-3021-209) and the *Option 11C Planning and Installation* (553-3021-210).

9 Restore the data from the external source that you saved in step 1:

— use RES command in LD 43 to restore data from a PCMCIA card

or

— use XRT command in LD 143 to restore data from a computer

End of Procedure

Replacing the NTTK13 Software Daughter Boards

This procedure is equivalent to a new system installation. It requires a PC or external PCMCIA drive to backup the configuration files, the current keycodes, feature set, ISM parameters and a Software Delivery Card with the current version of software.

Scheduled replacement of a software daughterboard

The following procedure describes how to replace the Software Daughter Board:

1 Log in and backup configuration files.

2 If required, update the Boot Code on the SSC card from a PCMCIA card. See *Option 11C and 11C Mini Upgrade Procedures* (553-3021-250), ‘Using the Flash Boot ROM Utility’ for instructions.

3 Power down the system.

4 Remove the NTDK20 SSC (Small System Controller) card from the cabinet.

5 Lift the daughter board up and off of the NTDK20 SSC circuit card until it is clear of the connector assembly.

6 Position the replacement Software Daughter Board.

7 Seat the Software Daughter Board on the NTDK20 SSC circuit card.

8 Reinstall the NTDK20 SSC circuit card in slot 0 of the main cabinet.

9 Power up the system.

10 Complete the steps required to perform a “New System Installation”.

11 Restore the backup configuration files.

———————— ***End of Procedure*** ————————

Unscheduled replacement of a software daughterboard

The following procedure describes how to replace a failed Software Daughterboard.

Note: Configuration files will only be as current as the last Data Dump (EDD).

1 If the system is down, go to step 5. If the system is operating, go to step 2.

2 Perform a Data dump.

— Load overlay program 143.

— Enter command EDD.

3 Disable all DCH using overlay program 60.

4 Disable all AML links using overlay program 48.

5 Change the software daughterboard.

— Power down the system.

— Remove the SSC from the cabinet.

— Remove the software daughterboard from the SSC card and replace with a replacement software daughterboard of the same family.
Example
The NTSK11AF. Providing the vintage is the same, proceed to Step.

OR

If the new card is not the same vintage but the same base board (NTTK13), you will need to use a Software Delivery Card to install the software daughterboard. Proceed to step 6 after system power up.

6 If the new software daughterboard is the same vintage as the old one, a Software Delivery Card is not needed for the install. After power up, the card will come up in the main menu.
From the Install menu, select item 1
"New System Installation - From Software Daughterboard". Proceed to step 9.

7 If an NTTK13 or a programmed daughterboard of a different vintage is being used, insert a Software Delivery card with the same release and issue of software as is being replaced into slot A of the SSC card, then log into the system.

8 From the main menu, select item 4
"New System Installation - From Software Delivery Card".

9 Proceed with the Installation Menu choices as described in the chapter titled *"Starting up and testing the system"* in the *Option 11C Planning and Installation* (553-3021-210) with the following exception:

— When prompted for the choice of database, select item 2
"Basic Configuration".

Note: It is important to choose "Basic Configuration", otherwise the system may invoke an EDD after loading the new software which may overwrite the customer data stored on the CPU.

10 Once the software is installed and the system is rebooted, the customers' backup configuration files must be restored.

— Login and load overlay program 143.

— From the Main Menu, select item 3
"Utilities".

— Select item 1
"Restore".

— Select item 1
"Backup Flash Drive".

— Confirm Restore database from the Backup Flash drive

— Reboot system by setting the power supply OFF, the ON.

End of Procedure

Replacing the NTDK22, NTDK24, NTDK79, NTDK84, or NTDK85 Fiber Daughter Board

The following procedure describes how to install and remove a NTDK22, NTDK24, NTDK79, NTDK84 or NTDK85 Fiber Daughter Board.

1 Set the breaker on the main cabinet power supply and reserve power to the OFF position.

2 Remove fiber cable from cable bay routing guide to allow enough slack in the cable to unplug NTDK20 SSC circuit card.

3 Disconnect fiber cable from Daughter Board.

4 Remove the NTDK20 SSC (Small System Controller) card from the system.

5 With NTDK20 SSC circuit card on a flat surface detach the Fiber Daughter Board.

6 Position the replacement Fiber Daughter Board.

7 Seat the Fiber Daughter Board on the NTDK20 SSC circuit card.

8 Remove the rubber plugs or caps from the connectors on the replacement daughter board and install them on the original daughter board.

9 Reconnect the fiber cable. Ensure that the fiber cable is fully inserted into the connector. A click should be heard when the when the cable is fully engaged.

10 Reinstall the NTDK20 SSC circuit card in slot 0 of the main cabinet.

11 Route the fiber cable in the cable bay routing guide.

12 Power up the system.

End of Procedure

Replacing the NTDK23, NTDK25, or NTDK80 Fbr Rcvr card

The following procedure describes how to replace the NTDK23 or NTDK25 or NTDK80 Fbr Rcvr (Fiber Receiver) card.

1 Set the breaker on the expansion cabinet power supply and reserve power to the OFF position.

2 Remove fiber cable from cable bay routing guide.

3 Hold the Fbr Rcvr card by the lock latches, unlock the latches, and slide the circuit card out of the cabinet.

4 Remove the fiber cable from the Fbr Rcvr card plug.

5 Place the rubber plugs or caps into the fiber cable sockets on the Fbr Rcvr card.

6 Remove the take-up spool cover.

7 Remove the fibre cable from the fiber take-up spool on the Fbr Rcvr card.

8 Remove the rubber plugs or caps from the fiber cable sockets on the Fbr Rcvr card.

9 Connect the fiber cable to the replacement card. Ensure the cable is fully seated.

10 Wind up any excess cable on the fiber take-up spool and replace the spool cover when complete.

11 Hold the replacement Fbr Rcvr card by the lock latches and slide it into slot 0 in the Expansion cabinet until it connects with the backplane.

12 Reroute cable in the cable bay routing guide.

13 Set the breaker on the expansion cabinet power supply and reserve power to the ON position.

End of Procedure

Replacing the NTDK26 Backwards Compatible Daughter Board

The following procedure describes how to install and remove the NTDK26 Backwards Compatible Daughter Board.

1. Turn off all power.
2. Remove the NTDK20 SSC (Small System Controller) card from the system.
3. Detach the Backwards Compatible Daughter Board from the NTDK20 SSC circuit card.
4. Position the replacement Backwards Compatible Daughter Board.
5. Seat the Backwards Compatible Daughter Board on the NTDK20 SSC circuit card.
6. Reinstall the NTDK20 SSC circuit card in slot 0 of the main cabinet.
7. Power up the system.

End of Procedure

Chapter 18 — Final maintenance procedure

Perform the final maintenance procedure to verify that the Option 11C is operating properly and there are no remaining faults.

CAUTION

Wear the antistatic wrist strap, provided in each cabinet and chassis, when handling circuit cards to prevent damage caused by static electricity.

Final maintenance procedure

1. Make sure all circuit cards that may have been removed are reinserted in their assigned location and enabled.
2. Make sure all wiring and connectors that may have been disconnected are reconnected.
3. Make sure all circuit cards and units that should be enabled are enabled. Digital telephones on a circuit card that was disabled may not be restored when the card is enabled. Each telephone should be individually disabled and re-enabled through **LD 32** (commands **DISU c u** to disable and **ENLU c u** to enable, where "**c**" and "**u**" are the circuit card and unit numbers). Service may also be restored by disconnecting and reconnecting the telephone line cord.
4. Make sure all circuit breakers are set to ON and any fuses (in power panels or auxiliary equipment) are inserted.

5 Clear fault indicators by entering
LD 35 for NTBK45 SYST CORE circuit card equipped systems
LD 135 for NTDK20 SSC circuit card equipped systems

To clear a major alarm indication and restore Power Fail Transfer Units (PFTUs) to normal operation, enter
CMAJ

To clear all minor alarm indications, enter
CMIN ALL

6 Set the midnight routine to run after you log out of the system by entering
MIDN

End the session in LD 35 or LD 135 and log out of the system
****
LOGO
(the midnight routine will now run)

7 Check system messages produced when the midnight routine runs. Clear any faults indicated.

8 If there was a sysload (reload) while you were clearing a fault, reset the correct time and date by entering
LD 2
STAD (day) (month) (year) (hour) (minute) (second)
Check the time and date you entered
TTAD
End the session in LD 2 and log out of the system
****
LOGO

9 Replace any covers that were removed.

10 Tag defective equipment with a description of the fault and return it to a repair center.

———————— ***End of Procedure*** ————————

Meridian 1

Option 11C and 11C Mini

Fault Clearing Guide

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